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IN THE

Supreme Court of the United States

OCTOBER TERM, 1934.

Nos. 255-6.

ALTOONA PUBLIX THEATRES, INC.,

Petitioner,

and

WILMER & VINCENT CORPORATION and LOCUST STREET REAL ESTATE COMPANY,

Petitioners,

vs.

AMERICAN TRI-ERGON CORPORATION and TRI-ERGON HOLDING, A. G.,

Respondents.

BRIEF FOR RESPONDENTS.

Opinions Below.

The District Court's opinion (Rec., Vol. II, p. 1027) is reported in 5 Fed. Supp., 32. The opinion of the Circuit Court of Appeals (Rec., Vol. II, p. 1157) is reported in 72 Fed. (2d) 53. The latter Court also entered an order correcting its opinion and rendered a supplemental opinion thereon on August 6, 1934 (Vol. II, p. 1175).

Jurisdiction.

The jurisdiction of this Court is invoked under Sec. 240a, Judicial Code, as amended by the Act of February 13, 1925, 43 Stat. 938 (Title 28, U. S. C. A., Sec. 347).

Questions Presented.

In these two suits for infringement of a single patent the only questions presented in this Court are whether the patent claims in suit are invalid for want of invention, because of anticipation, or because of a disclaimer filed before trial (Pets.' brief, p. 14).

Statement.

The patent in suit, #1,713,726, was granted on May 21, 1929 (III, p. 1-10, also see appendix herewith), upon an application filed March 20, 1922 (III, p. 13), with a German priority date of March 24, 1921. It relates to the photography of sound upon a moving film and its reproduction by means of acoustically modulated light, and is especially useful in recording and reproducing sound which accompanies the action portrayed in a motion picture. Under mesne assignment from Vogt, Massolle and Engl, the patentees, the patent is now owned by the respondent, American Tri-Ergon Corporation. On October 10, 1932, the bills of complaint (I, p. 9, 28) were filed against petitioners, who operate motion picture theatres charging infringement by the use of sound picture reproducing apparatus. A disclaimer to the patent was filed before trial (III, p. 227, and appendix herewith, p. 13-16).

Both suits were tried on the same record and defended by Radio Corporation of America on behalf of its wholly owned subsidiary, R. C. A. Photophone, Inc., licensor of the infringing machines. Validity was contested but not infringement (II, p. 1049). The type PS-16 machine (III, p. 330-32) involved in the Altoona Publix suit, was held to infringe claims 9, 13, 17, 18 and 19, as charged. The type PS-1 machine (III, p. 327-29) involved in the Wilmer & Vincent suit, was held to infringe claims 5, 7, 9, 13, 18 and 19, as charged (II, p. 1049, 1090).

The Radio Corporation and Western Electric Company are cross-licensors in the sound picture field (II, p. 1024-

25) and apparently have enjoyed a substantial monopoly in supplying sound picture machines in this country (II, p. 847-51; p. 3 of Pets.' brief for rehearing of petition).

The record here contains over 2,900 pages. The trial court heard many witnesses, fact and expert; witnessed extensive demonstrations of petitioners' and respondents' machines and of many alleged prior art models, and after an exhaustive review of the record, as shown from the many findings of fact and conclusions of law considered and passed upon (II, p. 1037-1129)—it rendered its opinion accompanied by said findings. The judgment of the trial court sustaining the validity of the patent was unanimously affirmed in the court below and the findings and conclusions of the trial court were expressly approved in its opinion (II, p. 1158). No other court has questioned the validity of the patent. The findings of the trial court, thus approved in the court below, cover the questions of anticipation, invention and validity of disclaimer now sought to be reopened in this Court.*

Photographic sound on film sound pictures presented difficulties of recording and reproduction which leading inventors repeatedly attempted to solve without success, until in 1921 solution was found by Vogt, Massolle and Engl. After several years of research and careful scientific work these patentees perfected the apparatus and methods of the claims of the patent in suit, and during 1921 demonstrated their invention with sound pictures to outsiders in Berlin. In the fall of 1922 sound pictures were successfully produced with their machines in two German theatres with very good results and satisfaction

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*For brevity, Findings will be designated F, and Conclusions as CL. The findings and conclusions as printed in the record embody page references to the typewritten record. We have therefore reprinted them in the accompanying appendix, with the page references conformed to the printed record.

to the public audiences (F 19, Appdx., p. 23, II, p. 1043; CL 18, Appdx., p. 61, II, p. 1084). Grand opera was reproduced with very good sound production (I, p. 113-115). The patentees were the first in the world to demonstrate by public exhibition either sound on film or sound on film sound pictures, which they did in 1922 with one of their machines built according to Figs. 3 to 6 of the patent (F 25, Appdx., p. 25, II, p. 1045). Up to this time, and for some time thereafter, not a single sound on film machine was ever used by anyone else outside of a private laboratory, with or without accompanying pictures (F 26, Appdx., p. 26, II, p. 1046). The apparatus and methods of the patent in suit enabled the establishment of a new and important art (F 23a, Appdx., p. 25, II, p. 1045).

This accomplishment was not the result of ordinary skill. The problems involved had for years baffled eminent scientists and others whose inventive capacity had been repeatedly demonstrated (II, p. 1084; 1159). The trial court held the patent in suit entitled to a pioneer status and that it should be liberally and favorably construed, since it covers combinations and method steps enabling the first successful sound reproduction with film records by the use of light (CL 2, Appdx., p. 57, II, p. 1078-1079).

The Court of Appeals found that "others tried and failed The patentees working together for years on this problem finally solved it and gave to the world a machine and method which revolutionized the moving picture art and drove sound on disk sound pictures from the market" (II, p. 1159).

Photographic sound recording involves translation of acoustically modulated light onto a photographic film; reproduction involves translation of the sound record on such a film, into acoustically modulated electric currents through the medium of light. While these patentees took out other patents pertaining to other phases of sound on film, the invention here is directed to the problem of eliminating distortion *in sound translation,* and thus to attain sound re-

production sufficiently realistic to accompany motion pictures.

This problem, solved by the patentees, involved several intricate factors, so interrelated, due to their reactions one upon another, that until each disturbing factor was discovered, its effect upon the others diagnosed and a remedy found and applied for the combined disturbing factors, the problem remained unsolved. Prophesies, speculations or efforts for remedying one or another of the disturbing factors while retaining others, got nowhere from a practical standpoint because the remaining disturbing effects left the result so poor that the actual effect of the proposed remedy could not be determined.*

Sound records on picture film comprise myriads of precisely placed photographic fine lines (or areas)—hundreds per inch, photographed in one-eighteenth of a second, and, varying in frequency and transparency according to complex sound vibrations. For distortionless sound recording *the spacing and transparency* of these lines upon a rapidly moving sensitized film must vary precisely in accordance with the vibrations of sound which are being recorded. Each line must be a sharply defined image of the *instantaneous* condition of this ever varying acoustically modulated light to which the rapidly moving film is being exposed. In the reproducing machine these fine photographic lines must be rapidly moved without disturbance of their frequency relationship,** through a fine line of

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*Dr. Kellogg of R.C.A. emphasizes the truth of this. In trying to locate irregularities he found that "Having no perfect reproducing machine it was impossible to test a recorder, and having no perfect recorder it was impossible to test reproducing machines" (III, p. 425).

**"Frequency changes of less than one-tenth of one per cent." may result in "two-to-one" (100%) variations in amplitude of sound (III, p. 426, line 4, article by Dr. Kellogg).

light at the point of sound translation, the light being thus varied according to the sound record. This acoustically modulated light shines on the photo-electric cell (hereinafter called P.E. cell) which converts the light variations into sound modulated electric currents varying directly proportional to the light variations, which in turn vary according to the spacing and degree of transparency of the photographed lines.

Any factor that disturbs the desired precise relationship between the acoustically modulated light and the spacing or transparency of the resulting photographic fine lines constituting the sound record will tend to distort the sound.

The patentees, as the result of extensive experiments (*infra*, p. 16) analyzed and diagnosed the various disturbing factors and collectively remedied them by features shown and described in their patent. To this end, they used acoustically modulated light as the translating means, thus avoiding sound distortion due to inertia, the scratching and wearing of the film and other irregularities in the use of stylus and other sound box devices; they momentarily endowed each short section of light flimsy film passing the translation point with the property of a weighty mass to give it the precise uniformity of speed required for the purpose, and to that end they utilized a flywheel with this section of film so harnessed thereto that the film moves in exact conformity with the flywheel; they momentarily arcuately bent the film at the translation point to avoid several disturbing factors of sound distortion peculiar to sound translation by light. Thus irregular transverse curling and buckling of the film at the sound track near the sprocket perforations was avoided and the film was kept precisely in focus. Its resulting firmness and stability at the translation point, prevented vibration and permitted the ***sound track portion*** of the film at this point to be free of any physical support which would accumu-

late dust and scratch and displace the film from focus* (Prof. Ballard, I, p. 271-75; 277, Q72; II, p. 914, Q808-9; F 56, Appdx., p. 43; II, p. 1064). They used an "optical slit" (a fine projected line of light) instead of a "mechanical slit" (a fine slit in a plate closely adjacent the traveling film), thus avoiding sound distortion due to a collection of dust and dirt (accentuated by the electrostatic property of the celluloid film) which will scratch the film and irregularly reduce or close the slit; and by using a P.E. cell in the reproducing machine they obtained true proportionality between the acoustically modulated light and the resulting current from the cell (F 1 to 17, inc., Appdx., p. 17-22; II, p. 1037-1042).

Light is uniquely adapted for sound translation, as it acts *without inertia or friction* and hence does not distort the most complex and rapid sound vibrations. Yet prior attempts to use a beam of light for sound reproduction were futile hopes because of the confusion of disturbing factors which had never been segregated and diagnosed so that they could be *collectively remedied.* The patentees by careful research and experiment determined that the P.E. cell could act also *without inertia* in cooperation with this light beam, and further that the motion of the film record through the fine line beam of light both in recording and reproducing had to be accurately controlled *with inertia* properly applied as taught in the patent. In sound recording the *position* and *motion* of this rapidly moving flimsy curling film at the translation point must be such that as it passes through the fine line of light it will receive a true photographic record of the acoustically modulated light. In reproducing the *position* and *motion* of the same film bearing the sound record must be precisely the same as it was when the record was made. Variations of the position or of the motion of the film within thousandths of an

*Displacement of the film one thousandth of an inch from the focal plane may increase the width of the fine photographed line 100% (I, p. 271, Q55).

inch and small fractions of a second will distort the recording and reproduction of sound.* Accordingly the motion and position of the film must be free from the smallest perceptible irregularities which cause sound distortion and noises, blotting out the benefits of using light, arcuate bending of the film and the P.E. cell.

In the few prior art paper suggestions of sound on film sound pictures, the film was literally charged with vibrations and complex irregularities of motion, caused for example by the picture intermittent mechanism, by the take-up reels, the drive gearing, sprocket teeth imperfectly meshing with the perforated film, and also by the varying friction and irregular deflections of the film at the straight light gate and "mechanical slit" structures commonly proposed.

Each successive short length of film at the optical slit must be instantaneously and momentarily endowed with the property of a heavy mass and brought into accurate focus with the fine line of light and yet permitted immediately to pass on out of the sound head. Applying the inertia control directly to the sound film adjacent the translation point had not even occurred to anyone.** No one yet knew

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*The motion of the film at the standard rate for motion picture production is ninety feet per minute or eighteen inches per second. The range of audible frequencies is from 16 to 16,000 vibrations per second. For sound pictures substantially from 30 to 5,000 cycles per second must be reproduced without distortion (Engl, I, p. 85). (See *Western Electric Co.* v. *Wallerstein*, 60 F. [2d] 723, 724.)

Thus in one second, up to five thousand fine lines of ever varying light must be accurately photographed on a short length of film.

**We have not overlooked the Dragoumis French Patent (V, p. 1379) for recording by stylus on film, as to which see F 56, Appendix, page 42; II, page 1062; discussed *infra*, page 37.

that irregularities in the film perforations and the meshing of the sprocket teeth therewith would cause distortion of the sound. No one had discovered the sources of the difficulties, although scientists had tried unsuccessfully for years to use light to translate sound to or from film. No one had successfully used film sound records of any kind, nor sound modulated light in any practical art.

The patentees solved all of these problems. The uniform speed of the film, the arcuate bending of the film and the focused line of light all coact at the same point to determine the desired spacing, definition and transparency of the fine light lines photographed for distortionless sound recording, including pitch and volume; and in reproducing they all coact at the same point in determining the character of each instantaneous, modulated fine line of light directed upon the P.E. cell to reproduce the sound without distortion (F 73, Appdx., p. 56; II, p. 1078; II, p. 1162-3).

Among the eminent scientists who had tried and failed, before and after the patentees' effective date of invention, were Dr. Story of the General Electric Company, with the aid of Irving Langmuir, Dr. Hull and other scientists in its employ, Professor Rankine, a well known English scientist, Dr. Lee DeForest, an eminent inventor, and Hoxie, of the General Electric Company. They had all through careful experiments endeavored to obtain satisfactory sound on film by recording and reproducing with light (CL 19, Appdx., p. 62, II, p. 1084). These efforts were all unsuccessful. No one other than these patentees and their licensees had successfully publicly demonstrated sound on film sound pictures prior to 1927. By August, 1926 the Western Electric Company succeeded in developing and putting out a sound on *disc* motion picture machine, and their machine, constructed for this purpose, was licensed to Warner Bros., one of the largest motion picture producers in the United States (II, p. 848; I, p. 230). This disc sys-

tem, known as the Vitaphone, was successful from the standpoint of sound quality, and resulted in the first successful commercial production of sound motion pictures in the United States. It was the highest attainment of those skilled in the art of sound pictures in this country. Of course the technical and commercial advantages of photographically recording and reproducing sound pictures from a film record were obvious, but *how to do it* apparently had not been obvious to the Western Electric Company which was offering and urging upon the industry the use of its sound on disc machines (I, p. 230). As late as August, 1926, the only sound picture machine being publicly demonstrated in this country was this sound on disc machine* (F 31, Appdx., p. 27, II, p. 1047).

William Fox, who was insisting upon sound on film, having acquired an option upon the patent in suit, brought Dr. Engl, one of the inventors, to this country to demonstrate his sound on film sound picture apparatus in December, 1926. Engl then not only disclosed his machines and system to the expert engineers of the Western Electric Company, but frankly discussed with them the principles of their operation and the means by which all of the difficulties in the construction of such a machine had been overcome (I, p. 116-17, 230; F 31, *supra*). These engineers, with this knowledge, then experimented with sound on film, although Western Electric at that time was promoting its

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*In the companion Paramount suit, No. 254, Western Electric's research engineer, Dr. Wente, testified that they were simultaneously working on sound on film and sound on disc for motion pictures; sound on film from 1913 to 1923, when it was dropped as unsatisfactory in favor of sound on disc; sound on disc from 1915 to 1924 when that system succeeded and was taken up with Warner Bros. in 1925 for commercial use (#254, I, p. 312-14). It is admitted that both systems require the same amplifier and loud speaker apparatus (II, p. 640).

disc system. As a result of Engl's demonstrations, Fox exercised his option. In July, 1927 Western Electric put out its first sound on film machine and by October of that year put out nineteen others (F 31, *supra*).*

In September, 1927 the Radio Corporation of America, a cross-licensee of the Western Electric Company, caused its subsidiary, R. C. A. Photophone, Inc., to be incorporated for the purpose of exploiting sound picture recording and reproducing machines. On October 28, 1928 this subsidiary produced its first machine, operating upon the principle of sound on film (F 29, Appdx., p. 26; II, p. 1046; II, p. 846). This machine was its PS-1 type, built by the Westinghouse Elec. & Mfg. Co. (II, p. 848) and found to infringe the patent in suit.

In the colloquial language of the trade, the entire industry has now "gone on film", and as the courts below have found, sound on film, first perfected by Vogt, Massolle and Engl, has entirely displaced the sound on disc system as developed and put out by the Western Electric Company in 1926, five years after the effective date of the patent in suit (F 24, Appdx., p. 25; II, p. 1045).

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*There is reference in the record to private trials of a system of sound on film sound picture production by a Mr. Case and the Fox-Case Company in 1925-1926, but no proof that this system was patented. It certainly was anticipated by Vogt, Massolle and Engl (effective date of 1921), and whatever the system was it is apparent from the proof of infringement that R. C. A. Photophone, Inc., copied the invention of the patent in suit, and the invention drove sound on disc developed by the Western Electric Co., from the market. The Vogt, et al., foreign patents corresponding to the patent in suit were issued in 1923 and 1924, and these disclosures were published to the art long before the Case system (whatever it was) was developed (V, p. 1549-1566).

R. C. A. Photophone, Inc., the wholly-owned subsidiary of the Radio Corporation of America, which is actively defending these suits, and Electrical Research Products, Inc., a wholly-owned subsidiary of the Western Electric Company which is defending the Paramount suit No. 254, are the two largest suppliers in the United States of sound reproducing apparatus. Together they had made over 9,000 installations of such apparatus in the United States up to the time of the trial, in June, 1933 (Petition for Rehearing of petitions for writs of certiorari filed herein, p. 3; II, p. 847, 850). Both of these companies are now licensing sound on film equipment throughout the United States, but these machines are so constructed as to be capable of employing either film or disc records (V, p. 1411-1417).

No doubt the industry prefers the sound on film system, but this is no reason for accusing the respondents of claiming tribute from and seeking to dominate an industry (Petition for Certiorari, p. 3, and Petition for Rehearing, p. 2) which now pays tribute to and is dominated by the Radio Corporation and Western Electric, who are supplying equipment which infringes the patent in suit. Until 1932, when the industry discarded sound on disc records, both systems were in use. They were not competitive, because these two great corporations furnished both.* If the patent in suit is sustained, competition between these two systems will result, and the industry as a whole will benefit.

Summary of Argument.

The question of patentable invention is a question of fact decided for the respondents in both courts below, and this Court will not review the findings of fact which fully sustain the conclusion of validity.

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*The methods of the Western Electric Co. in dominating and controlling this industry are disclosed in *Stanley Co.* v. *American Tel. & Tel.*, 4 Fed. Supp. 80.

The invention in suit is the product of the careful research, experiment and study of highly skilled scientific engineers, the character of whose work and accomplishment discloses that the highest degree of inventive capacity was required of them to perfect machines for recording and reproducing sound on film suitable for accompanying motion pictures. This they successfully accomplished with sound pictures in 1921 and demonstrated to the world in 1922 before others equally skilled in the art striving to accomplish the same result had been able to do more than experiment with the recording of sound by means of light without successful accomplishment. The patentees' machines were brought to this country in December, 1926, and demonstrated to engineers for the Western Electric Co. early in 1927, who prior thereto had developed and in 1926 placed upon the market a successful system of recording and reproducing sound on *disc* in connection with motion pictures. The sound on film system of the patent in suit has succeeded commercially to such an extent that it has displaced the previously successful system of sound on disc developed by the Western Electric Co. Infringement is not disputed here and the Radio Corporation of America through its subsidiary, R. C. A. Photophone, Inc., and the Western Electric Co., now supply the American market with reproducing machines equipped for sound on film. Those supplied by R. C. A. Photophone, Inc., which are here involved, embody the invention of the patent in suit and infringe its claims.

Analysis of the patent confirms the findings of the trial court that each of the elements and combinations of the claims was clearly disclosed in the application originally filed. That each of the elements of the patent in suit coacts directly with the others to produce the new and useful result of prevention of sound distortion, was found in both courts below.

The attempt to belittle the accomplishment of the patentees by characterizing all of their improvements as obvious, may not be supported by the assertion that the art

was awaiting improvements in amplification. Improved amplification was accomplished long before by Lowenstein as early as 1912, whose work was available to the Western Electric Co., as was also the work of Langmuir with the high vacuum tube as early as 1913. The fact is that the art was waiting for the work of the patentees in the development of sound on film, and not for improvements in amplification.

Analysis of the claims in suit confirms the findings of the lower courts that the claims embody novel combinations of great importance and utility to the practice of recording and reproducing sound in accordance with the teaching of the patent, and that all of the elements of the several claims cooperate to produce distortionless sound reproduction.

Upon a consideration of references to the prior art upon which the petitioners rely, both courts below found no anticipation, and further that the great advance in the art accomplished by the patentees in this suit clearly involved invention. These conclusions are fully sustained upon examination of the prior art cited in this court which serves to emphasize rather than to discredit the striking advance made by the patentees in effecting the combinations of the patent claims in suit. *Smith* v. *Snow*, —— U. S. ——, decided January 7, 1935.

Radio Corporation of America praised the invention not only by imitation but by endeavoring to procure a license under the patent in suit. Said corporation and those associated with it in the ownership of patents in this art, also praised the invention by filing applications for patents upon structures similar to those disclosed by the patentees, with claims many of which were denied upon reference to the patent in suit. All of this was done long after the invention of the patent in suit was reduced to successful commercial practice.

The conclusion of patentable invention predicated upon the findings of fact approved in both courts below, finds irresistable support in the decisions of this Court (cited,

infra, pp. 53 to 58) which have established the tests to be applied in distinguishing invention from mere mechanical skill.

Petitioners contend that the court below fell into error by regarding the invention as a combination of all the elements disclosed in the specification, rather than as a combination of such of the separate elements as are brought into combination in the claims in suit. There is no basis in law for this contention. A patentee who discloses a patentable combination is entitled to claim every new and useful combination or sub-combination which he has disclosed, and under the authorities cited, *infra,* pages 58 to 60, there was no error in finding a patentable combination of all the elements and sustaining claims covering novel combinations of the separate elements of great utility in the reproduction of sound on film.

Nor is there any merit in the contention that the disclaimer in this case was invalid. Its purpose and effect as the trial court found was to restrict the claims to the disclosure in the drawings and specification, and it finds full support in this disclosure. Each claim affected by the disclaimer is diminished, and under the authorities cited on pages 60 to 70, *infra,* the disclaimer was authorized by the statute and is valid. Furthermore, the assertion of counsel that the disclaimer was drawn upon the infringing machines, in which the Radio Corporation of America had made large investments in good faith and in the belief that the patent as issued was clearly invalid, not only finds no support in the record, but is contradicted by the written correspondence of the Radio Corporation itself, from which it is entirely clear that its investments were made with full knowledge of the pendency of the patent application and later of the issued patent, the subject matter of which is embodied in the machines which were found to infringe in this suit.

Conclusion follows that the patent and disclaimer were valid and the judgments below should accordingly be affirmed.

ARGUMENT.

POINT I.

The Invention Was Patentable and Was Not Anticipated.

The question of patentable invention is a question of fact. *Thomson Spot Welder Co.* v. *Ford Motor Co.*, 265 U. S. 445; *Concrete Appliances Co.* v. *Gomery*, 269 U. S. 177, 180. Both Courts below decided this question against the petitioners. Under the well-established rule this Court accepts the findings in which two Courts concur unless clear error is shown, *Texas & N. O. R. Co.* v. *Brotherhood Ry. &c.*, 281 U. S. 548, or, in patent cases, unless the question of fact has been differently decided in two circuits. *Thomson Spot Welder Co.* v. *Ford Motor Co.*, supra; *Concrete Appliances Co.* v. *Gomery*, supra.

The claims in suit were sustained in the District Court upon extensive findings of fact predicated upon evidence much of which was conflicting and contradictory (II, p. 1037-90). The Circuit Court of Appeals found no error justifying reversal of the trial Court's findings or conclusions, and upon a careful review of the record stated its own conclusions upon the facts and the law, which are in accord with those of the trial Court (II, p. 1158-72). Upon the facts thus found the decision of the Court below is in accord with the decisions of this Court upon the question of invention.

History of Inventors' Work.

The inventors, well known scientists, in 1918 started to develop photographic sound on film sound pictures such as are in general use today (I, p. 81). They "were the first in the world to demonstrate by public exhibitions, either sound on film or sound on film sound pictures, which they

did in 1922 with one of their machines according to Figs. 3-6 of the patent'' (Ex. 17, photo, *infra*, p. 19; F 25, Appdx., p. 25; II, p. 1045). In 1922, after four years of research and development work, they gave repeated commercial exhibitions in European Theatres (F 19, Appdx., p. 23; II, p. 1043).

Dr. Engl, a physicist (Univ. of Berlin, coworker of Röntgen of X-ray fame), testified that when they started, nothing practical had been accomplished; that he and his associates had to work out the problems from the ground up. He mentions Ruhmer, the only one who had *actually* tried sound on *film* prior to them, and says that his abandoned experiments were just a crude beginning; from his sound record one could just recognize that it was a human voice (F 27, Appdx., p. 26; II, p. 1046). Also Edison, who used a *cylinder* phonogram synchronized with a picture machine, had no real results (I, p. 80-2, 72).

Engl reviews the patentees' work in discovering the sources of the difficulties and in testing and adopting means for their solution. As to uniform film motion, they at first unsuccessfully relied upon the constancy of speed of the driving motor. Next, they shortcircuited copper bars in the motor to increase the load to help speed uniformity (in the same general way that Hoxie of the G. E. Co. unsuccessfully applied a governor brake on his machine as additional load in striving for uniform speed—F 44, 48, Appdx., p. 33, 34; II, p. 1053-4). But this failed. Next they put a flywheel on the driving motor shaft (which as petitioners' textbook, Ex. 71, shows, is the customary location for a flywheel to control speed). This also failed. Finally they discovered the solution of placing the flywheel directly at the sprocket or roller adjacent the translation point, suitably driven and connected with the film to effectively control the film as it passes the translation point (I, p. 90-1). Some of their early experiments were carried

out on a machine (Exs. 18, 19, photos opposite this page, I, p. 88-100). Engl explains their use of the curved film at the translation point (I, p. 92-4, 96), and the optical slit of which he produced original photographed images even finer than those now used (I, p. 111-12, Respts.' Phys. Exs. 25, 78). He produced one of their twenty odd notebooks with sketches of parts of their February, 1921 machines (I, p. 94-7; II, p. 954-7, Phys. Exs. 77-80, 83) with over forty actual film records showing how causes of irregularities were painstakingly located and eliminated.

All this they accomplished by early 1921. He points out lack of prior knowledge of the necessary properties of the P.E. cell for sound reproduction* (I, p. 82-8; 186-7); that scientists had disputed some of these properties and had definitely denied that the cell had certain other properties now known to be essential for the purpose (one of these was Dr. Ives of Bell Laboratories; see also General Electric article; Respts.' Exs. 84, 85, 86, III, p. 547-59; and Findings of Judge Adkins, III, p. 284); that one of the properties had not even been investigated, and there were no suitable instruments available to measure lag of such cells for this purpose; that the selenium cell had been the standard suggestion for the purpose, used by Ruhmer, but had none of the required properties for sound on film reproducing, and that the only known uses of the P.E. cell (solely experimental) were for laboratory *photometric* purposes. Note also 1920-1921 notebook data and curves showing patentees' investigation of relationship of P.E. cell current with various slits (II, p. 956-7; Respts.' Phys. Exs. 82, 83).

Their second machine (Ex. 19A, photo opposite, described I, p. 92-4, 98) corresponded to Fig. 1 of the patent

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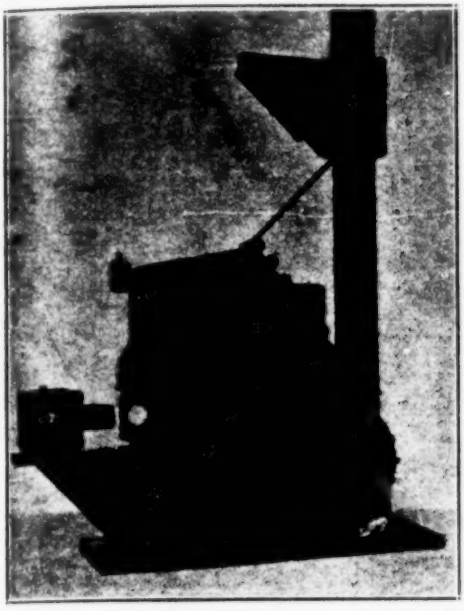
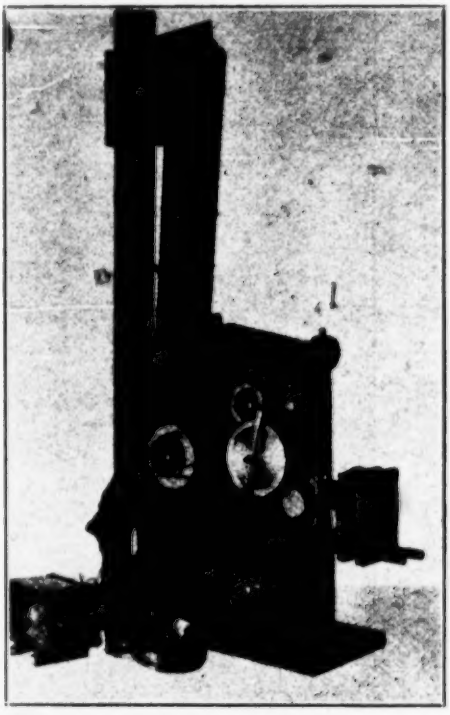
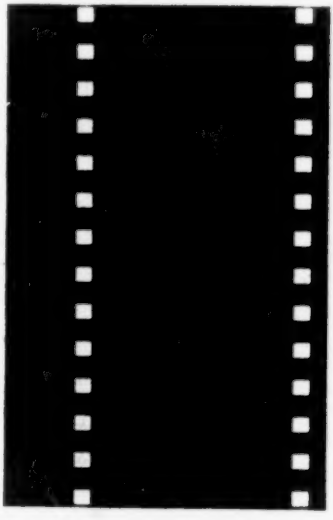
*Lack of lag, i. e., instantaneous response to illumination by *widely fluctuating* light from 16 to 15,000 cycles per second, lack of fatigue under such fluctuating light, and straight line relationship between illumination and current from cell for all audible frequencies.

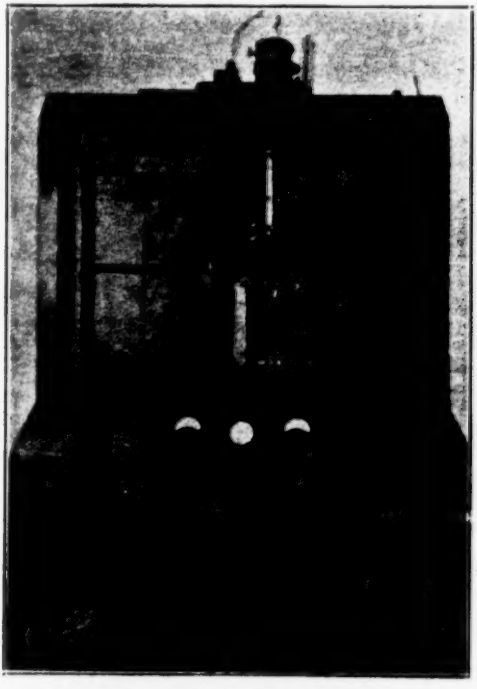




Early Recording and Reproducing Machine (Pltf.s' Exs. 18, 19).



Sample of Tri-Ergon 1923 Sound and Picture Film (Pltf.s' Ex. 20).



Recording and Reproducing Machine Demonstrated Early 1921 (Pltf.s' Ex. 19A).

later sold. The performances of speech, music and orchestra were very good, and very satisfactory to the public (I, p. 104-6; 113).

The performance of one of these same machines at the trial was excellent by modern standards (F 18c, 20, Appdx., p. 23; II, p. 1043). The cost to their company for laboratory expenses and completing the lot of 25 machines by May, 1925, reached 290,000 gold marks; and due to the then financial stress in Germany, there being no studio then in the sound picture business, which requires laboratories, artists, etc., they could not continue on their capital, so resorted to licensing; that "Ufa" acquired an exclusive license and a number of their machines; installed these in theatres in 1926; recorded and reproduced with them from 1926 to 1928, bringing out several sound pictures (I, p. 214-17; Pets.' Ex. 128, V, p. 1634). The German license was then acquired by "Tobis", one of the two largest German sound picture concerns, the other being Klangfilm (I, p. 218); that Tobis during 1929-1930 built another large lot of machines according to Fig. 2 of the patent (I, p. 466-7). An article (Pets.' Ex. 130) shows that the same Tri-Ergon system is still in use by Tobis. Thus in Europe the production of commercially successful sound film pictures resulted directly from the work of these patentees. So also in this country, commercially successful sound film pictures resulted directly from Dr. Engl's exhibiting and explaining to Western Electric one of his said Tri-Ergon machines embodying the invention and brought here in December, 1926, at which time Western Electric* had gotten

*Shortly after Engl's demonstrations to them, Bell Laboratories, a Western Electric subsidiary (R. C. A.'s cross-licensee), in May, 1927, attempted to broadly patent the filter flywheel elastic coupling combination for reproducing from film by light, generally along lines covered by claim 7 of the patent in suit (Pfannenstiehl file, Respts.' Phys. Ex. 76, p. 6, 7).

no further than sound on disc (F 31, Appdx., p. 27; II, p. 1047; pp. 9-11, *supra*). The latter's first sound on film machine was put out July, 1927, R. C. A.'s first machine was put out in October, 1928 (II, p. 846).

ANALYSIS OF PATENT.

The Disclosure Is Sufficient.

As is obvious from the original application (III, p. 15) and from the patent as issued (III, p. 1), the specification and drawings describe and show no other apparatus or method than those wherein sound is translated to and from a photographic film by acoustically modulated light (F 1, Appdx., p. 17, II, p. 1037). The character of the light beam used for this purpose is shown in the drawings and described as a narrow line focused on the film (F 2). The line of light projected by the "objective *o*" (thus forming the optical slit) is described in the original application (III, p. 17, 19) and shown in the drawings (more clearly in Figs. 3 and 4, p. 2). In the patent as issued it is also described (III, p. 6, lines 1-3, 43-5; p. 7, lines 22-48).

Petitioners do not deny that an optical slit is disclosed and the trial court so held (F 8, Appdx., p. 19; II, p. 1039). Their only criticism of this disclosure is that the patent does not show a line of light *back* of the "objective *o*" which is to be focused down on the film, but the provision of a line of light to be focused by an objective was well known in optics* (I, p. 441-3, XQs417-31), and one of the patentees' earlier filed patents, No. 1,590,185 (III, p. 270), mentioned in the specification of the patent in suit (III, p. 7, line 45) discloses one such line source (F 8).

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*The patentees' form of illustration of the optical slit has been closely followed in the patents of Dr. Kellogg and Heisler of the General Electric Co. (III, p. 472-3, element 9; p. 484-5, element 7; p. 522-4, element 13).

That means for feeding the film, for harnessing the flywheel to it at or adjacent the translation point, for spring connection between the flywheel and the driving shaft, for smoothing out all irregularities due to engagement of the sprocket teeth with the film and for instantaneously but firmly holding the film in proper position at the translation point were all sufficiently disclosed, does not appear to be disputed (also F 12 to 17, 23, 23a, CL 7, Appdx., p. 20-22, 25, 58; II, p. 1040-42, 1045, 1080). The patentees proposed to give to that portion of the almost weightless film strip passing the translation point the property of considerable inertia. They did not suggest that this might be done in any old way but that the record must move "in exact conformity with the rollers and the rotating mass" (III, p. 5, lines 52-4). For example, neither a flywheel in an adjacent picture projector head, nor a flywheel so connected to the film driving sprocket as to permit irregularities in the relative rotation of the two, nor a film that slips on the roller is within the instructions of the patent and none of these would solve the problem.

For constructions where a sprocket is used adjacent the translation point for driving the film past this point, and this sprocket is driven by a flywheel secured to its shaft, so that the flywheel drives the sprocket and film, and the flywheel in turn is driven by the driving mechanism, the patentees provide and recommend a spring between the driving mechanism and the flywheel which protects the flywheel, sprocket and film from the irregularities of the driving mechanism. With this arrangement (also used in the PS-1 machine), the flywheel when up to running speed, does not have to act to eliminate irregularities in the driving connections between the motor and flywheel, but accepts these as they are (the spring taking care of these irregularities) and the flywheel is free to apply its full inertia and does apply it undisturbed, to the sprocket located adjacent the translation point and to the shaft on which the flywheel is fixed. Thus the flywheel only has to take care of the irregularities in the rotation of this sprocket

and the movement of the small length of film momentarily harnessed thereto adjacent the translation point. The disturbances in other mechanical parts and in other parts of the film itself are thus excluded (F 16, 17, Appdx., p. 22; II, p. 1041-2; II, p. 878-81, 1161; I, p. 98).

In the construction of the patent (Fig. 2) where a smooth roller instead of a sprocket is provided on the flywheel shaft, and the flywheel does not drive the roller and film, but the film is driven by a sprocket on a different shaft (such as V2 in Fig. 2), the film is wrapped tautly around a substantial portion of the periphery of the smooth roller to avoid slippage and to harness the film to this roller so that the roller and flywheel will be driven by the film as distinguished from having the flywheel drive the film. In this arrangement the flywheel and the roller on the shaft therewith, and hence the film wrapped around the roller, are free of the small irregularities that may occur in the driving mechanism connected with the film driving sprocket, because of the intervening length of film between the film driving sprocket and the smooth roller; so that here again the flywheel, roller and small portion of film passing the translation point, are free of the irregularities arising from the driving mechanism connected with the film driving sprocket (F 16, 17, *supra*). This arrangement is also incorporated in the PS-16 machine.

The arrangements of Figs. 1 and 2 of the patent also provide for the film being in contact with a substantial portion of the periphery of a cylinder in the travel of the film from the translation point to a sprocket that forms a part of the film-progressing means. There is a distinct advantage in this arrangement because the cylinder irons out any small irregularities in this portion of the film that may be produced by the meshing of the driving sprocket with the film before such irregularities reach the translation point (I, p. 259, Qs15-16; p. 314, Q173; F 65, Appdx., p. 51; II, p. 1073). This feature is also embodied in the PS-16 machine.

The arcuate bending of the film at the translation point where the fine line of light is focused upon it, is shown

clearly in the drawings of each of the two forms of apparatus respectively in Fig. 2 and Figs. 3-6 (III, p. 1-3; F 9, Appdx., p. 20; II, p. 1040), and described in the original application (for example, III, p. 17, 18) and also in the patent (for example, III, p. 6, lines 18-25; 78-81).* With respect to the constructions in Figs. 2, 3, 4 and 6 of the patent, petitioners admit that "the film is necessarily bent in an arc of a circle at that point"—the translation point where it passes over the cylinder (their brief, p. 9). They merely contend that it was not claimed in the original claims, and that the advantages of it were not stated. But the patentees need not disclose the advantages of patented structures. *Stow* v. *City of Chicago,* 104 U. S. 547, 550; *Eames* v. *Andrews,* 122 U. S. 40, 55-6; *Mead-Morrison Mfg. Co.* v. *Exeter Machine Works,* 225 Fed. 489, 496 (C. C. A. 3). While the authorities hold that it is not necessary that all features of an invention as finally claimed must be claimed originally, so long as they are disclosed originally**, nevertheless the patentees did include the feature of arcuately bending the film at the translation point in one of their original claims (claim 1, III,

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*Arcuate bending is also shown but less clearly in Fig. 1, intended to represent one of the patentees' first operative constructions (I, p. 455, XQ515; I, p. 93-4; photo, Respts.' Ex. 19A; III, p. 338).

**_Abercrombie & Fitch Co._ v. _Baldwin,_ 245 U. S. 198, 206; _Smith_ v. _Snow,_ —— U. S. ——, decided January 7, 1935; _Hobbs_ v. _Beach,_ 180 U. S. 383, 395-7; _Michigan Carton Co._ v. _Sutherland Paper Co.,_ 29 F. (2d) 179, 184 (C. C. A. 6); _Heller Bros._ v. _Crucible Steel Co.,_ 297 F. 39, 43 (C. C. A. 3); _Van Kannel Revolving Door Co._ v. _Lyon & Healy,_ 247 F. 329 (C. C. A. 7); _Wagenhorst_ v. _Hydraulic Steel Co.,_ 27 F. (2d) 27, 31 (C. C. A. 6). _Railway_ v. _Sayles,_ 97 U. S. 554, cited by petitioners, is distinguished in _Hobbs_ v. _Beach, supra,_ and the Railway case has no application to the case at bar involving an entirely different fact situation.

p. 20)—"in providing the recording - - - if a cylinder (R) with flywheel (m) is used" (the recording is done) "upon the circumference (*Fig. 2*)". Petitioners have admitted that Fig. 2 has arcuate bending. Furthermore, as early as May, 1923, other claims to this feature were made (for example, claim 4, III, p. 27) and claim 6 was made in March, 1925 (III, p. 53). Even claim 9 of the patent in suit for arcuate bending was made in May, 1928 (III, p. 79), months before R. C. A. put out a single sound on film machine, which was October, 1928 (F 29, Appdx., p. 26; II, p. 1046). Thus the arcuate bending feature was originally disclosed and claimed.

The photoelectric cell of the patent is fully shown and described in the original application and in the patent. Petitioners do not deny that it is shown in the drawings. They merely assert that "There is nothing in the *specification* to indicate that a cell of that type is contemplated". But even this statement is contrary to the testimony of the experts on both sides and to the fact. It is true that the original specification (III, p. 17) uses the shorter expression "photo cell *z*" instead of "photoelectric cell"*; but at page 19 the cell is described as the "cell *z* with the cathode *l* and the anode *p*" and this is the kind of cell fully disclosed in the drawings at *z* in Figs. 1, 2, 3, 4 and 6 (most clearly in Figs. 3 and 6; III, p. 1-3). Petitioners' expert, Waterman, testified that this description and showing is that of a photoelectric cell (II, p. 714, XQs242, 246; Ballard, I, p. 268, Q44). The trial court found that "A photoelectric cell is shown as the light sensitive element at the translation point" (F 10, Appdx., p. 20; II, p. 1040). The patentees referred to their photoelectric cell in original claim 3 (III, p. 21) as "the light-electric

*Dr. Kellogg, now with R. C. A., used the terms "photo cell" and "photoelectric cell" synonymously as did petitioners' witness Hoxie (III, p. 523, line 43; p. 524, line 38; I, p. 601, line 1).

element", but the only kind they disclosed was the P.E. cell. Again, in March, 1925, the patentees made a claim, 10 (III, p. 54), which included "a *photo-cell,* and *means for directing light* through the overhanging portion of the ribbon onto said photo cell". The same descriptions and drawings of the P.E. cell are contained in the patent as issued (III, p. 6, line 49; p. 7, line 28). Thus the P.E. cell was clearly disclosed.

The trial court found that each of the various features above discussed is disclosed in the original application as filed (F 6, Appdx., p. 19; II, p. 1039); that "the disclosure or teachings of the specifications and drawings of the patent are sufficient" (F 23, Appdx., p. 25; II, p. 1045); and also held that the combinations and methods of the claims in suit were adequately disclosed in the application as originally filed (CL 7, Appdx., p. 58; II, p. 1080).

Both courts found that each of the elements of the patent in suit coacts directly with the others to produce a new and useful result, prevention of sound distortion (II, p. 1162-3; 1078; 1030).

Amplifiers.

Petitioners assert (1) that the patent does not disclose the electrical devices for producing amplification, connected to the P. E. cell; (2) that these were developed in this country, and (3) that such devices are necessary for sound reproduction. As to point (1), these devices were not and should not have been included in the patent as they form no part of the particular problem to which this invention is directed, i. e., avoidance of distortion *adjacent the translation point,* and hence could not have been claimed in this patent. They relate to another phase of the general problem, i. e., amplifying the currents after leaving the P. E. cell. Such amplification has been accomplished in various ways and is the subject matter of other patents of these patentees (I, p. 72, 119-20; for example, patents

1,587,786 and 1,628,377; III, p. 348; Pets.' Phys. Ex. 135, item 25; and Tri-Ergon amplifier, III, p. 355), and Western Electric had the Lowenstein 1912 amplifier (*Western Electric* v. *Wallerstein*, 60 F. [2d] 723), and Langmuir's "high vacuum tube" patent filed in 1913 (*DeForest* v. *G. E. Co.*, 283 U. S. 664, 675).

As to point (2), amplifying means were developed here but they were also developed abroad by these patentees who had them in public use in 1922—of the type now in general use here (I, p. 68, 120). Joy did not testify that "amplifiers developed in this country were indispensable". His testimony was that "There were no other amplifiers available in America" (I, p. 244, XQ181), and that Western Electric was the only one in position to promptly produce them commercially (I, p. 247, RDQ204), and they owned the Lowenstein patent.

As to point (3), amplifiers were, of course, necessary but long prior to 1921, amplification (Lowenstein and Langmuir) was so far ahead of sound translation by light that it never held back the latter.* Improvements in amplification were made but it does not follow that all other improvements including the one here, were obvious. It was held in the Wallerstein case, *supra*—"The success of sound pictures was due solely to high quality reproduction; that is, without distortions". True. It is exactly what the patent in suit is directed to—improvements to prevent sound

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*In the Wallerstein case (60 F. [2d] 724), the court said:

"The patents relate to sound transmission and communication, particularly as now found in the development and reproduction of *sound pictures*" (p. 724). * * * (Italics ours.)

"Lowenstein made a valuable contribution which has proven of great aid to mankind, particularly in the art here under consideration" (p. 727). * * *

"It" [the Lowenstein 1912 invention] "has worked well, and has resulted in the practical and everyday operation of the vacuum tube" (p. 726).

distortion (but at or adjacent the translation point). The electrical devices are directed to prevention of distortion elsewhere, but *they can only amplify the kind of currents they receive. Distortion at the translation point must be eliminated first by other means.* Without distortionless sound translation there can be no distortionless reproduction from the film.

The Claims in Suit.

Considering the claims as limited by the disclaimer (which now forms a part thereof) and stripped of some technical language:

Claim 5 calls for a film phonograph wherein sound is *translated by light* and wherein a *sprocket* (rather than a smooth roller) meshing with a perforated film, is provided *adjacent the translation point,* with the *flywheel* associated with it, so as to provide the necessary uniformity of film speed. As the trial court held, this combination is not anticipated by any of the prior art* and is new and useful (F 74, Appdx., p. 56; II, p. 1078; CL 36, Appdx., p. 67; II, p. 1090). The patentees were the first to appreciate that even the small irregularities arising from the meshing of gears or arising from the engagement of sprockets with the film between the flywheel controlled sprocket and the translation point would be sufficient to disturb the smoothness of film movement required for photographically translating sound; hence the flywheel should be applied to the film beyond any such mechanism, i. e., between any such mechanism and the translation point. This claim 5 specifies an arrangement which would avoid the detrimental effect of such devices on the smooth operation of the film, i. e., the flywheel is associated with the film driving sprocket adjacent the translation point, and with the film passing over a portion of this sprocket to insure proper meshing or harnessing

*The prior art is discussed, page 32, *infra,* after reviewing the claims.

of the two to avoid the irregularities which might occur if a more or less tangential engagement were made between the two. This claim is not applicable to Fig. 2 of the patent in suit, nor to petitioners' PS-16 machine.

Claim 7 in substance is like claim 5 except that it is not limited to a "toothed cylinder" (sprocket) associated with the flywheel, but calls for a "cylinder" on the flywheel shaft adjacent the translation point for driving the film, and over a portion of which the film passes, a driving member coaxial with said shaft, *a resilient connection* (spring) *between* said driving member and flywheel, and stops for *limiting* the amount of yielding of the spring.

The additional advantages of this combination* have been given at page 22, *supra*. The claim is not applicable to constructions of the type of Fig. 2 of the patent, hence is not applicable to the PS-16 machine. The trial court found (F 33, 66, 74, CL 36, Appdx., p. 28, 52, 56, 67; II, p. 1048, 1073, 1078, 1090) this combination was not anticipated by any of the prior art and is new and useful.

Claim 9, in substance, calls for the method of translating sound to or from a film by acoustically modulated light, bending the film arcuately longitudinally at the translation point while rapidly and uniformly moving the film in a circumferential direction at said point, the uniformity of movement being effected by subjecting the portion of the film passing said point, to the inertia of a rotating weighty mass.

The method thus involves the cooperating features of sound translation to or from the film by *light*, the *arcuate bending of the film at the translation point*, and providing *uniform movement* of the film at this point by *the flywheel*. The method avoids the objections to the stylus recording and reproducing on film (which never have been used in practice—F 28, Appdx., p. 26, II, p. 1046) and includes the advantage of holding the film firmly and accurately in

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*The cooperation of the elements of the several claims is discussed *infra*, at page 32.

position for receiving the image of the projected light, as explained pages 5 to 9, *supra;* and it provides uniform motion of the film at the translation point by flywheel control. As the trial court found, the method was not anticipated by the prior art and was new and useful (same findings as to claim 5, and F 68, Appdx., p. 53; II, p. 1074).

Claim 13 in substance calls for sound on film reproducing apparatus utilizing an acoustically modulated line of *light,* a *photoelectric cell,* means for moving the film past the cell with a rapid *uniform motion,* wherein the *flywheel* is operatively connected with the film through means which imparts uniformity of motion of the flywheel to the film, and an *optical slit* for illuminating the cell (the means for producing which is defined in technical language).

The claim thus includes a combination of cooperating elements which provides the advantages of the optical slit, the P.E. cell and the precise uniformity of motion required with sound translation by a line of light (already explained *supra,* p. 5-9). As the trial court found, the combination is not anticipated by the prior art (same findings as to claim 5, and F 34, 69, Appdx., p. 28, 53; II, p. 1048, 1075).

Claim 17 in substance calls for a film phonograph in which sound is translated by *light,* and wherein the means for supporting and moving the film past the translation point includes a *sprocket* engaging the film, and a *cylinder over a substantial portion of the periphery* of which the film is in contact *adjacent the translation point,* in its travel from said point to said sprocket, and a *flywheel* operatively associated with said cylinder so that the film-progressing means advances the film past the translation point *at uniform speed* under control of said flywheel.

The claim thus calls for the cooperative features of sound translation by light, applying the flywheel control to the film through a cylinder adjacent the translation point and over which the film passes, and a sprocket beyond said cylinder for driving the film. This arrange-

ment provides the desirable features disclosed in the patent (Figs. 1 and 2) for ironing out any small irregularities in the film movement at the translation point due to engagement of the driving sprocket with the film, as found by the trial court, who also found that the claim was not anticipated by the prior art (F 65, Appdx., p. 51; II, p. 1073; I, p. 259, Qs15, 16). This construction applies to the PS-16 machine but not to the PS-1 machine, nor to Figs. 3-6 of the patent in suit.

Claim 18 in substance calls for a method of translating sound to or from the film by acoustically modulated *light*, which comprises rapidly advancing the film past the translation point and subjecting the motion of the film passing said point, to the control of *inertia means* by passing the film over a rotating member and *so applying inertia* to this member *as to eliminate substantially all irregularities* in its rotation, to effectively eliminate irregularities in the movement of the film.

Thus this claim calls for sound translation by light and subjecting the motion of the film at the translation point to the flywheel control by passing the film over a rotating member and applying the flywheel to said rotating member and hence to the film, so as to eliminate substantially all irregularities in the film movement.

Claim 19 incorporates all of claim 18 and adds thereto the feature that the film is *yieldingly pressed* into contact with a supporting area *immediately adjacent the point of translation, this pressure cooperating with the inertia control* (flywheel) in the elimination of irregularities in the film motion.

The claim thus provides for the cooperative features of translation by light, the flywheel control in such manner as to effectively eliminate irregularities in the film movement at the translation point, and for the yielding pressure of the film upon its support at the translation point, which cooperates with the flywheel in smoothing out irregularities. As the trial court found, claims 18 and 19 were not anticipated (same findings as to claim 5).

From what has been stated, *supra*, pages 5 to 9, 22 and 23, it is obvious that all of the elements of the several claims cooperate to produce distortionless sound reproduction. The irregularities of speed affect the pitch and may even cause the sound to be garbled beyond recognition; arcuate bending to keep the film in focus and free of vibrations, affects both pitch and volume; the optical slit avoids irregular variations in the width and length of each line of light, and hence affects pitch and volume. They all thus cooperate with the beam of light and coact to determine the amount of light and the frequency of that light falling on the P.E. cell at any instant, and the P.E. cell responds faithfully to the frequency and the amount of the light thus impressed upon it by the cooperation of these elements. The presence of and advantages of each of the elements enhances the quality of the sound obtainable due to the presence of the others. Cooperation of the elements for distortionless sound reproduction was found by both Courts below (F 73, Appdx., p. 56; II, p. 1078; 1162-3).

THERE IS NO ANTICIPATION.

Sound On Film Machines.

Petitioners' collection of so-called prior art citations is a good example of efforts so often made to defeat pioneer patents by reference to the failures of the prior art. Such references, "gathered as it were, from the scrap heaps of human effort"* cannot serve the purpose, because they contrast the failures of others with the accomplishment of the patentees. There had been no successful sound on film (F 26, 27, Appdx., p. 26; II, p. 1046), and the prior devices here relied on were mere attempts or paper suggestions to solve the problem, many of them wholly in-

*Hough, C. J., *American Stainless Steel* v. *Ludlum Steel Co.*, 290 F. 103, 105 (C. C. A. 2d). See also Alschuler, C. J., *Wahl Clipper Corp.* v. *Andis Clipper Co.*, 66 F. (2d) 162, 165.

operative or absurdly useless for the purpose and all of them as the Court below said, were "confusing and not helpful" (II, p. 1162).

Petitioners cited over 70 alleged prior art references (F 71, Appdx., p. 56; II, p. 1077). They point to certain of the individual elements of the claims as suggested here and there in different paper patents. "Common justice forbids such a defense" (*Parks* v. *Booth,* 102 U. S. 96, 104). As Mr. Justice Holmes once stated, "It is a fallacy to break the fagot stick by stick" (*Schlitz Brewing Co.* v. *Houston Ice & Brewing Co.,* 250 U. S. 28, 29).

Of the citations here relied upon, only *three,* Duddell, Rankine and Ries*, suggest apparatus for reproducing sound on film by light or for making a record asserted to be capable of reproduction by light. Bell & Tainter, No. 341,214 and Dragoumis relate to sound on film recording *and* reproducing by a *stylus;* and petitioners were unable to show that any such machines had ever been successfully used (F 28, Appdx., p. 26; II, p. 1046). They failed to prove that one had ever been operated up to the time of the trial. Pedersen, Bock and Byron suggest recording sound by a *spot* of light, making a wavy line record which requires making a matrix therefrom, and reproducing the sound from this matrix by a *stylus* or the like. There is no proof that anyone ever attempted to operate such a hybrid method.

It is significant that although petitioners at the trial demonstrated many alleged models of prior art devices, *they did not attempt to exhibit or demonstrate a model of any of these photographic sound on film devices* upon which they now rely (I, p. 553-6).

Pedersen British Patent (V, p. 1349)—This was the patent principally relied upon in the lower courts. The trial court held it to be a vague foreign patent; an inoperative

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*Here we omit the Hoxie machines because not proven to be early enough, and because unsuccessful (F 40-3, 51, Appdx., p. 30-32, 35; II, p. 1051-2, 1055).

suggestion for recording sound by a spot of light* producing a wavy line; requiring a *matrix* and *stylus* for reproduction (nullifying the benefits of recording by light); that it does not teach where the flywheel shall be located in the combined sound picture machine, much less does it teach that it should be applied at or adjacent the translation point, and that it had contributed nothing of value to the practical art and did not meet the claims in suit (F 54, 71, CL 9, 10, 3, Appdx., p. 35, 56, 58-9, 57; II, p. 1056, 1077, 1079-81).** As the patent is reviewed in detail in the findings, further discussion here seems unnecessary.

Bock patent (IV, p. 803)—This is another crude, "highly imaginative" and "inoperative" suggestion (II, p. 918-19) for recording a "sinuous" or wavy line by a spot of light, and then preparing from this negative record "a

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*In recording with a *spot* of light, the *amount* of light being photographed on the film does not vary but only the position of the spot on the film. The result is a wavy line record transmitting a uniform amount of light which cannot be reproduced by a P.E. cell; hence the requirement of a matrix record and stylus for reproducing, as disclosed in Pedersen and other patents of this hybrid type.

**Petitioners' statement that Pedersen's stylus *reproducer* is on the same machine as the *recorder* is incorrect (the two separate machines are shown V, p. 1349) and their short interrupted quotations mixing the two machines are misleading (their brief, p. 27-8). Their assumed construction and position of the rollers on the *stylus reproducer* (which they urge against claim 19) have no basis in the record except their own expert's sketch which was ignored in both Courts below because not justified by Pedersen's disclosure (F 54, CL 10, *supra*). The *Kher* and *Randall* patents, with which they try to cure Pedersen's vagueness, have nothing to do with recording on film by light.

variable resistance circuit controller" to be put into an electric circuit. The circuit controller in the form of a strip (Fig. 3) is molded from a mixture of various conducting and non-conducting ingredients some of which will be affected by light, so that when the wavy line negative is printed onto this and suitably developed, the wavy line will permit current to pass through it. An electric contact in the form of a brush is then applied to this strip (Fig. 4 of the patent) and as the record is moved it was supposed to vary the current passing to a telephone circuit (IV, p. 804, pat. commencing line 49, and claim 1, p. 805). As to the recording, the film is fed by a rewind reel A, which, the Court found in connection with the Ries patent, will not give uniform motion (F 59, Appdx., p. 47; II, p. 1068; CL 9, Appdx., p. 58; II, p. 1080). No flywheel control is suggested; no optical slit; no photoelectric cell. It does show a point of light projected on the film passing over a roller, but even as to this, as Prof. Ballard points out the advantages of arcuate bending are peculiar to translation by a line of light, and are not important in recording by a spot of light such as proposed by Bock, Pedersen and Byron (I, p. 278; II, p. 917, Q819-20; I, p. 271-5). This has not been disputed.

This patent of 1887 utterly failed to teach anyone how to solve the problem of distortionless sound translation. The only comment made about it by petitioners' expert was when he was asked if it was true that it and other patents showed arcuate bending, he answered, "It is" (II, p. 686, Q107). Ballard's testimony that the apparatus was highly imaginative, inoperative, and could not produce uniform speed, but on the contrary gave non-uniform speed, is not disputed, and the trial court found that the apparatus was inoperative (in connection with CL 9, Appdx., p. 58; II, p. 1080). Petitioners thought so little of Bock that they requested no findings of fact on it. Obviously it does not anticipate any of the claims of the patent in suit or teach anything useful in connection with the invention here and both Courts below so held (CL 9, *supra*).

Byron patent (III, p. 146)—This patent was not even referred to at the trial by petitioners' expert, who expounded many of the seventy odd patents; hence not by respondents' expert. For this reason we submit that it should not be considered by this Court. Why it was not mentioned is obvious. It is an absurdly inoperative suggestion for recording sound by a spot of light and reproducing it by a matrix formed on the thickened edges of the film strip to operate with a stylus (Fig. 6; pat., p. 1, lines 83-105).

Referring to Fig. 1, the film is drawn directly from the delivery reel 8 over a "guide pulley" 13 by driving sprocket 19, thence direct to the rewind reel 11. No flywheel control is suggested, much less any particular location for it; indeed the film must have *intermittent motion* for the taking of the pictures behind the lens 26; and no photoelectric cell is involved. The contraptions shown in Fig. 3 for supposedly forming two wavy lines, each by a spot of light, consist of two large tubes 31, 32 pivoted to diaphragms 39, 40 which are supposed to cause these cumbersome tubes to oscillate in accordance with acoustic vibrations when one speaks into the horn 47. As pointed out in connection with Bock, the arcuate bending here has no benefit in connection with recording by a spot of light. The patent was cited in the Patent Office but overcome to the satisfaction of the technical examiners (III, p. 62). It contributed nothing to the art.

Bell & Tainter, #341,214 (IV, p. 770)—shows several types of machines, the one relied upon being shown in Figs. 18, 19. This device is supposedly for recording sound by a stylus upon a wax-coated ribbon running from a delivery reel over a smooth driving disc to a take-up reel. The disc is connected to a second disc which is in turn geared by *tangential friction* gearing to a driving shaft having a flywheel with a handle.

As the trial court found, petitioners produced an alleged model of this device but they did not demonstrate it (the reason is obvious). The court also found that gear-

ing the flywheel to the disc as disclosed, would result in slippage, and prevent the flywheel giving uniform speed to the film; that other features would also prevent uniform speed; that the device *cannot produce uniformity of speed* suitable for sound recording on film, and that the patent does not disclose the subject matter of any of the claims in suit. The apparatus is described in the finding (F 57, CL 9, Appdx., p. 44, 58; II, p. 1065; 1080). The patent shows one of many ways in which a flywheel may be applied so as *not* to give uniform speed, and is an illustration of how loosely that term is used in the mechanical arts by those who are not concerned with or ignorant of the precise uniformity required for photographic sound on film of the character disclosed in the patent in suit. The patent does show the paper strip passing over a disc at the stylus, but as the trial court found, the problems solved by arcuate bending are special to the recording and reproducing of sound by light (F 56, Appdx., p. 42; II, p. 1064). No one ever reproduced sound on this device. It never solved the problems.

Dragoumis (V, p. 1381)—This is a foreign patent disclosing a crude suggestion for stylus recording on an endless band of celluloid passing over a drum where it is proposed to record sound in a series of loops by transverse movement of a stylus carriage geared up to the drum. It does not mention a flywheel or anything about speed control, and the stylus mechanism, etc., would prevent uniform speed.

The trial court in its detailed review of this patent found that it does not disclose speed control by a flywheel; that the spoked pulley indicates the absence of any idea of flywheel effect; that the patent does not teach anything with reference to the patent in suit and does not disclose the subject matter of any of the claims in suit; and that the device could not produce uniform motion suitable for photographic sound on film (F 56, CL 9, 10, 13, Appdx., p. 42, 58-60; II, p. 1062, 1080-82).

The device was not shown to have ever been used in the art.

Petitioners say that the Dragoumis pulley obviously acts as a flywheel, and cite *American Road Machine* case, 164 U. S. 26, where this court said of well-known large heavy hand wheels used because of their momentum effect in road scraping machines to relieve the operator of manual strain, that the failure to describe such a wheel which was shown in the drawings as a momentum wheel was immaterial because it was such in fact. Here the picture is not of a flywheel but of a pulley, and as the trial court held, "a spoked pulley used in this type of apparatus is indicative of the absence of any idea of flywheel effect" (F 56, *supra*).

Duddell (V, p. 1340)—This is another foreign patent with a crude suggestion for recording and reproducing sound by a line of light. The film is fed by a rewind reel, i. e., directly from one reel to another which, as both experts agree and as the court found in connection with the Bell & Tainter patent (p. 36, *supra*, F 57, Appdx., p. 44; II, p. 1065), would produce irregular motion. There is no suggestion of any flywheel control, much less the proper location for one. The fact that the patent refers to "steadily and uniformly" moving the film from one reel to another, shows that "uniformity of motion" in the sense required by the patent in suit was not even understood by Duddell whose construction made such uniformity impossible. The patent discloses a selenium cell rather than a P.E. cell (II, p. 926-8; Judge Adkins' finding No. 31; III, p. 292). As to the optical slit for which it is cited, it is true that it discloses an optical slit, but the disclosure would never teach one to use the optical slit because Duddell in his drawings shows the mechanical slit (in the plate *d'*, Figs. 6, 7) and he describes the mechanical slit as "advantageous" to "improve the definition and firmness of the line of light" (V, p. 1338, lines 31-2). He thus *points away* from the

optical slit and recommends the mechanical slit; and there is no arcuate bending. The flimsy curling film is under no adequate control at the translation point either with respect to its motion or position. As the trial court found, this patent does not teach the invention of the claims of the patent in suit (in connection with CL 10, Appdx., p. 59; II, p. 1081) and held that it could not be modified to provide an anticipation. Of course there can be no anticipation by a prior patent or publication unless there is a disclosure of means adequate to practical accomplishment by those skilled in the art. Inoperative and unworkable suggestions do not advance the art or anticipate future advances through practical accomplishment (*Seymour* v. *Osborne,* 78 U. S. 516, 555; *Eames* v. *Andrews,* 122 U. S. 40, 66; *Robinson on Patents,* Sec. 227, p. 310).

Rankine, British article (V, p. 1399)—This is a 1920 publication of a paper read by Prof. Rankine at a scientific meeting in London. It is cited to show the idea of the optical slit for recording and reproducing sound by a line of light, and it does show this single element of the invention of the patent in suit. He drives the film directly from one rewind reel to another (impossible for uniformity of speed). He uses no arcuate bending at the translation point where arcuate bending is useful in this form of recording; he uses a selenium cell instead of a photoelectric cell, and suggests no flywheel control, much less the proper location for it. His efforts were so crude that he erroneously concluded that one could record with "a slit image" less than .2 mm. and yet reproduce the record with a slit image of over 1 mm. without "marked effect" (V, p. 1403) and that

> "the ear can be very easily deceived, and that only a *rough approximation* to the original vibrations is necessary in the reproduction of sounds required in ordinary listening". (Italics ours.)

At the end of the article a commentator discussing the paper, stated:

> "Mr. Guild said he hoped the author would continue his experiments until he produced a proper gramophone."

Rankine failed to do this but the patentees did it.

It is significant that in spite of Prof. Rankine's known ability, and that his work here was substantially contemporaneous with the work of the patentees, he got no practical results and totally lacked appreciation of the features of the claims in suit which resulted in success.

The trial court held that it was an unsuccessful effort and did not teach the invention of the claims in suit (in connection with CL 10, 19, Appdx., p. 59, 62; II, p. 1081, 1084).

Ries (V, p. 1232). The patent was not issued until 1926. As the trial court held, it is too late to constitute "prior art", i. e., to show the state of the art; and can only be used if it shows "prior invention", i. e., if the disclosure fully meets the entire invention of the claim in suit* (CL 12, Appdx., p. 60; II, p. 1082); and that this Ries application did not show prior invention of the subject matter of the claims in suit (in connection with CL 12).

**Milburn Co.* v. *Davis-Bournonville Co.*, 270 U. S. 390, 401-2; *Allied Metal* v. *Standard Electric*, 57 F. (2d) 296; *Ladd* v. *W. & H. Walker, Inc.*, 7 F. (2d) 72, 78. Petitioners (their brief, p. 21) only assert that such a pending application is effective as establishing "prior invention"; but we stress the distinction between "prior invention" and "prior art" when the thing cited does not disclose "the invention" claimed, because petitioners' reference there did not disclose "prior invention". In the *Milburn* case it was pointed out that the prior application "gave a complete and adequate description of the thing patented to Whitford" (at p. 399).

Ries shows a sound on film sound picture machine utilizing a line of light, but as the trial court held, the film is pulled from the translation point by a rewind reel which cannot give uniform speed (Fig. 1); the patent does not disclose flywheel speed control, or a photoelectric cell, or an optical slit, or the arcuate bending of the film at the translation point which would be useful in this type of machine; but it uses a mechanical slit and a selenium cell, which distorts sound; that it is impossible with this device to obtain uniformity of speed suitable for sound on film reproduction by light; and that the patent does not disclose the subject matter of any of the claims at issue (F 59, Appdx., p. 47; II, p. 1068; and in connection with CL 9, Appdx., p. 59; II, p. 1080).*

Petitioners (their brief, p. 17) quote from Ries, that the film is moved "at a uniform constant speed", but they fail to quote the first part of the sentence (V, p. 1238, pat. lines 69-77, 120-130), which recites that it is moved by the windup reel 4 which, as the trial court found, and the experts agreed, cannot give uniform speed in the sense of the patent in suit. The complete sentence also mentions the intermittent movement of the film past the picture projector, and the term "uniform constant speed" is apparently used to distinguish from the intermittent movement of the adjacent section of film at the picture projector.

Ries' drawings show what he thought were the complete details for a sound on film sound picture machine, but the many shortcomings for the purpose constitute persuasive evidence of the patentability of the invention here.

It thus clearly appears from the review of all of these alleged sound on film machines, that they are all either

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*The Ries patent was litigated in *Stanley Co.* v. *General Talking Pictures Corp.*, 47 Fed. (2d) 817. In that case validity was "assumed" (p. 819) and the bill was dismissed because no infringement was shown (p. 820).

inoperative or useless for the purpose of respondents' and petitioners' machines, and that none of them anticipates or teaches the invention of any of the claims in suit.

Bell & Tainter, 341,213 (IV, p. 752)—This shows a highly imaginary device for making sound records upon a revolving glass disc for scientific investigation, there being no means shown or indicated whereby the record could be reproduced (II, p. 893). It is significant that all that petitioners' expert had to say about this patent was that it

> "records, for example, by the use of light, and the machine employs a heavy flywheel indicated at 8" (II, p. 651).

Respondents' expert reviewed the patent (II, p. 893-4) explaining that the arrangement was not intended to give uniform rotation to the *disc* on which the recording was to be done, but only uniform linear surface velocity (this, of course, means variable speed of rotation). He further points out that, as is well known, the tangential friction gearing between the driving flywheel and the disc on which the record is to be made is bound to create slippage and prevent uniform speed as in the other Bell & Tainter patent (*supra*, p. 36). In addition, the patent contains differential gearing and a screw feed to move the record disc *radially* past the optical axis and the friction driving roller. This would produce further irregularities in speed and *requires slippage* between disc and friction driving roller. Since the arrangement for rotation of the disc by the flywheel is similar to that of the other Bell & Tainter patent, the trial court's holding on that patent (p. 37, *supra*) applies to this.

The light falling upon the rotating reciprocating disc (Fig. 2) is supposed to be modulated by acoustically vibrating a fluid jet (Fig. 3) flowing past a slit in plate 256, the jet being jiggled by speaking against the sounding board 261. The whole idea is so absurd that peti-

tioners' expert did not attempt to explain how it could operate, and it does not warrant further consideration. This patent never taught anyone how successfully to record or reproduce sound by light. It does show an optical slit, but the patent states (IV, p. 757, lines 79-90) that where it is desired to restrict the light to a small area on the record plate—a fine line (used for sound records) a second slit close to the plate should be used—*a mechanical slit.* The mechanical slit is shown at 252 in Fig. 1. The patent thus points away from the optical slit to the mechanical slit.

Langmuir (IV, p. 1129); **Hull** (IV, p. 689); **Kunz** (V, p. 1167)—These are cited to show that P.E. cells were known. Petitioners do not contend that these patents suggest the use of the P.E. cell for sound recording. The patentees of the patent in suit do not claim to have invented the P.E. cell, but admit that it long was known as a scientific laboratory device. They do claim that they were the first to determine that it possessed all of the requisites for sound reproduction by light and was therefore superior to the deficient selenium cell which had been the standard suggestion for the purpose (I, p. 85-8). They filed an earlier application claiming it with suitable circuits for this purpose, and it has been judicially determined that they were the first to discover that it possessed all the properties necessary to make it superior to the selenium cell, and the first to apply it to sound reproduction (Judge Adkins' Finding No. 4; III, p. 279).

Claim 13 in suit is not a claim for the P.E. cell. As the trial court found it is a claim for a particular combination in a sound on film machine in which the cell is included as one of the elements (F 34, Appdx., p. 28; II, p. 1048) and that none of these three citations discloses or suggests the use of the P.E. cell for sound reproducing, nor the combination of claim 13 (F 69, Appdx., p. 53; II, p. 1075).

The trial court also held that the Kunz patent issued too late to constitute part of the state of the prior art (CL 12, Appdx., p. 60; II, p. 1082).* Hull and Langmuir not only failed to disclose the use of the P.E. cell for sound reproduction, but the disclosures in their patents cannot be used for sound reproduction (II, p. 936-9).

Gabrie French patent 456,880, referred to among the P.E. cell patents, was not pleaded by petitioners or touched on at the trial. It therefore should not be considered by this Court. It is merely a part of one of petitioners' exhibits of a German patent office proceeding, and in desperation is now put before this Court. No mechanism is disclosed in the patent. It suggests recording might be done by intermittent motion as used in motion pictures, on the theory that interruptions of less than a tenth of a second will not interfere with sound reproduction. It mentions the P.E. cell but advises the use of the selenium cell (Judge Adkins' Finding No. 25; III, p. 289). Gabrie was ignorant of the real problems of recording and reproducing sound vibrations.

Hoxie's efforts.—The trial court found that petitioners failed to establish Hoxie's machines as prior to the invention in suit; that in any event they were unsuccessful; that if he ever had a flywheel for speed control it was a failure and was promptly abandoned for a governor control (as

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*But this does not excuse petitioners from the misleading quotation from Kunz (p. 41 of their brief). Kunz (V, p. 1168, lines 102-113) states that the uses for which he had found the cell applicable were "photometric", "spectroscopy", and in "astronomy", and then states, "For accurate measurement of light *for all the above purposes*" the cell should have the characteristics specified by him. None of these uses would determine the cell's usefulness for the totally different requirements of sound reproduction as given *supra*, page 18.

used for disc gramophone machines) unsatisfactory for sound on film machines; that his testimony was that his machines also lacked the arcuate bending and optical slit; that these alleged early machines were never used outside of the company's private laboratory and the company never put out a sound reproducer* (F 27, 39-53; Appdx., p. 26, 30-35; II, p. 1046, 1050-56; CL 14, 15, 17; Appdx., p. 61; II, p. 1082-3).

Hoxie's proofs as to the construction and operation of his machines and the time when these efforts were made and were allegedly consummated, rest upon recollection over a long period of years. The court found that the memories of Hoxie and the two mechanics called were poor, and failure to call his younger assistant was not explained. There is a strange absence of the usual complete General Electric records. Hoxie's failure to apply for a patent on his devices until 1927 defies explanation, if he was a prior inventor (*Webster Loom* v. *Higgins*, 105 U. S. 580, 595). Proof beyond a reasonable doubt adequately corroborated by contemporary structures or records was required, but the trial court was not satisfied that the proofs met this test. *Eibel Process Co.* v. *Minnesota & Ontario Paper Co.*, 261 U. S. 45, 59-60. The court's findings predicated upon the oral testimony of interested witnesses are so complete and detailed on Hoxie's efforts that further discussion of these issues of fact is not necessary.

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*In an endeavor to dignify Hoxie and give petitioners some colorable equity, they assert in their brief (p. 12, 41) that their PS-1 and PS-16 machines were derived from Hoxie's work; but it is stipulated that the first PS-1 and PS-16 machines installed by R. C. A. Photophone were made by the Westinghouse Electric & Mfg. Co. of Pittsburgh (II, p. 848).

Cylinder and Disc Gramophone Art.

These machines are cited only on speed control of cylinder and disc stylus records which are solid and compact and are hence easily and rigidly affixed as an integral part of the mandrel of the machine throughout the playing of the record. With gramophone stylus records the entire stylus track is permanently engraved as a rigid unit and the spacing and angular position of each part of it bears the same fixed relation to the rotating axis in recording as in reproducing. If this relationship to the axis is imperfect in recording, as for example with a slightly eccentric cylinder, the imperfection will be largely compensated in reproducing because the relative position of the stylus track in respect to the rotating axis is precisely the same in recording as it is in reproducing. Indeed the spiral track on a disc record necessarily moves more rapidly at the periphery than at the center of the disc both in recording and in reproducing. Thus such records do not involve the problems of a long flimsy and curling film record, each part of which is in the sound head for but a moment and has only a highly flexible connection to its other parts, and the sound track of which is unattached to any fixed or permanent axis, yet must be held accurately in position in focus with a beam of light passing *through* it and in precisely the same position as when the record was made. The only solution is substantially perfect uniformity of motion and position both in recording and in reproducing, else imperfections in the two operations will be cumulative.

Edison patent 227,679 (IV, p. 743); **Edison Triumph** laboratory recorder (Pets.' Ex. 31). The findings of the trial court with respect to this patent are so detailed and complete that we will only state a few points here (F 60 to 64, incl., Appdx., p. 48-51; II, p. 1069-1072; CL 13, Appdx., p. 60; II, p. 1082).

As found by the trial court and shown by the patent in suit, the patent was granted with the understanding and

with the acknowledgment in the specification that cylinder and disc gramophone devices were known (F 61; III, p. 5, lines 13-28); that the idea of and means for giving a high degree of uniformity of speed to successive lengths of continuous film as they pass through the sound head, by momentarily endowing them with the property of a weighty mass, involves a distinctly different problem and is a different thing from these cylinder and disc gramophones, and that none of these citations contain the subject matter of any of the claims in suit (F 62, *supra,* Appdx., p. 49).

Petitioners' witness Hammond, an Edison technician, long experienced with both types of machines (the Edison cylinder gramophone and present sound on film reproducers) testified as to the two types, that there is "an entirely different condition existing" and there is "an entirely different problem in the two types of machines" and that "you have entirely different problems to meet". Ballard testified to the same effect and both courts below so found (F 60, *supra,* p. 46; II, p. 1163).

As the trial court also found, Edison patent 227,679, the one chiefly stressed here, was cited in an opposition proceeding in the German Patent Office against one of the German patents directed to the idea of applying flywheel speed control to linear sound carriers, but the German tribunal disregarded it and others like it, stating that "In these the problem solved by the attacked patent is not present", etc. (F 61, *supra*). In this Edison patent and the instruction booklet stressed here, the cylinder and the hand crank flywheel there disclosed are reciprocated endwise by a screw feed. Petitioners have failed to show how a long non-reciprocating film with light shining through it could be applied to this device.

As reviewed by the trial court in Finding 62, *supra,* Edison later departed from his flywheel on the mandrel shaft and went to flywheels on geared shafts and to flyball governors in his later patents, and the disc gramophone art followed him (Berliner, IV, p. 866; Clark, IV, p. 904, and others

cited). Ball governor controls have been satisfactory for such gramophone machines; but as the trial court found, they are not satisfactory for sound on film machines, as they may introduce oscillations (F 39, Appdx., p. 30; II, p. 1050). This is further persuasive proof of the differences in the two problems.

Edison was no mean mechanic. He found these governors better for his gramophones, but for sound on film machines they are sources of irregularities and unsuited, as Steiner found the Hoxie machine governor was "forever unbalanced" (I, p. 540, Q57; 542).

The fact that Edison was refused a claim on his flywheel arrangement in his patent 227,679, and that the claims in suit were granted, is further proof that the problem involved here is something different from that in the Edison gramophone. Edison later strove for sound pictures, but got no further than synchronized stylus-picture machines, utilizing his gramophone on the stage and his picture machine at the rear of the theatre, one belted across the theatre to the other, and a spring-friction clutch with "play" between flywheel and gramophone cylinder—fatal for sound on film, and a ball governor for speed control—also fatal for sound on film.*

Edison lived until 1931, but great as he was, he failed where the patentees succeeded.

Underhill (IV, p. 957)—The single comment of petitioners' expert (II, p. 656) on this complicated patent was that Fig. 1 showed a very heavy flywheel *g*8 driven by a belt *g'*. Both he and petitioners in their quotation from

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*For spring-friction clutch between flywheel and cylinder in Edison's Kinetophone, see Petitioners' Exhibit 42, IV, page 693. Hammond admitted the play was "necessary" for the Edison machine but "would be very bad" in sound on film machines (I, p. 354, 358-59). As to the "speed control by motor governor", see Petitioners' Exhibit 15, IV, page 643; I, page 371.

this patent (their brief, p. 25) failed to state what respondents' expert points out (undisputed); that between this flywheel and the cylinder record there is a lost-motion clutch which would set up irregularities in the drive between the flywheel and the sound record, allowing considerable lost motion between the two (II, p. 897-8). He points out that this and other heavy varying loads would prevent the kind of uniformity of motion comparable with what the patent in suit requires, and that Underhill teaches that speed variations in the *cylinder* record movement of 1% are negligible (as they may well be), whereas with the sound on film apparatus of the patent in suit, it is well known that speed variations must be kept within a small fraction of this value.

Constable (V, p. 1186)—Is another cylinder gramophone machine using a "governor 15", not a flywheel, for regulating speed. It is cited against claim 7 merely to show a spring connection between the motor and the mandrel of the record cylinder. Since the patent was not granted until August, 1922, as the trial court held it cannot be used to show the state of the art, but only to show "prior invention" (CL 12, Appdx,. p. 60; II, p. 1082; authorities, p. 40, *supra*). Petitioners have not attempted to apply claim 7 to this patent, and obviously it cannot be done, so it does not constitute prior invention; and the trial court so found (F 33, 66, Appdx., p. 28, 52; II, p. 1048, 1073; CL 12).

Amet (IV, p. 1077) is cited for the same purpose as Constable and is included in the court's finding 66 with Constable. In addition to this, the undisputed testimony of respondents' expert is that the leather drum connection in the Amet patent is to prevent the transmission of *noises* (instead of speed variations), from his motion picture machine to his synchronized cylinder record (II, p. 746, 866).

German Nullity Decision and Claim 7.—Petitioners mention this decision (their brief, p. 21) and argue as if the claim at issue there was the same as the claim here; but

this is not the case. The situation here and that of the German patent are entirely different as to facts and law; and the trial court so found, including a detailed statement of the situation (F 67, Appdx., p. 52; II, p. 1073).

The Motion Picture Art.

Holst (IV, p. 896)—This patent shows an inferior type of picture projector having nothing to do with sound. It is cited to show a flywheel. The trial court held that motion picture machines are different in construction and function from sound heads and involve different problems, and a flywheel in such a machine is for a different purpose than that of the patent in suit, i. e., it is to prevent strains on the *driving* mechanism; that uniformity of speed is not important in such machines as the eye cannot detect substantial variations in speed (F 38, Appdx., p. 30; II, p. 1050). The court also found that Holst was from a non-analogous art (in connection with CL 11, Appdx., p. 59; II, p. 1081). The impertinence of motion picture projectors to the problems of sound on film as regards speed control, was admitted by petitioners' witness Hoxie, and by Heisler in securing General Electric patents on the uniform control of sound film (Respts.' Phys. Ex. 39, p. 24-5; III, p. 474, lines 102-112).

The court should not be misled by the sketch (Pets.' brief, p. 32) which is not in evidence. The drawings of the Holst patent (Figs. 1-3) show quite a different machine which, with the description, at once gives the necessity and reason for the flywheel in that case. Petitioners are using no such picture projector in their machines, which have the usual intermittent motion; yet they seize on this picture projector to justify their sound apparatus because it has a flywheel, though not relating to sound on film or involving its problems or shown to have been used. *Clough* v. *Gilbert*, 106 U. S. 166, 176:

> "The structure was not designed for the same purpose as Clough's; no person looking at it or using it

would understand that it was to be used in the way Clough's is used, and it is not shown to have been really used and operated in that way."

Terwilliger (IV, p. 1098)—Cited to show a curved gate in a motion *picture projector.* On the undisputed testimoney of respondents' expert, the trial court found that any curving of the picture film at the picture gate would throw the picture out of focus on the screen; that the Terwilliger picture gate was inoperative and non-analogous art, and that petitioners do not use a curved surface at their picture gate but do use it at the translation point in their sound head (F 68, Appdx., p. 53; II, p. 1074; in connection with CL 9, 11, Appdx., p. 58-9; II, p. 1080-81). Not using it for the purpose taught by Terwilliger but using Terwilliger to try to justify its use for another purpose is another example of the character of their defense. *Clough* v. *Gilbert, supra.*

R. C. A. and Its Cross Licensees Praised the Invention and Attempted to Claim It In Their Later Applications.

Prior to this suit, R.C.A. and its cross-licensees gave their true opinion on the merits and patentability of the invention in their own patent applications—all far too late or else unjustified because indisputably inoperative and lacking in disclosure.

R.C.A.'s Page patent has claims to sound on film apparatus using light, having a flywheel arranged closely in accordance with the patent in suit for uniform motion, and with a variation of the arcuate bending feature (Respts'. Phys. Ex. 58, p. 8). R.C.A.'s Mauer patent stresses advantages of the arcuate bending in recording with light (III, p. 442, lines 111-21). R.C.A.'s struggles to patent the invention in the completely inoperative Cawley patents were reviewed at length by the trial court (F 55, CL 21a, Appdx., 38, 63; II, p. 1059, 1085). Petitioners'

witness Steiner (in a Gen. Elec. patent, III, p. 365-6) praises the arcuate bending in reproducing with light, as his invention. But his broad claims were rejected on the patent in suit (Respts'. Phys. Ex. 36, p. 21, 23, 30). Petitioners' witness Hoxie in a 1927 application claimed means for securing uniform motion in sound on film apparatus using light. He had a maze of pulleys, belts and governors,—no flywheel as taught in the patent in suit. His broad claims were rejected on the patent in suit (Respts'. Phys. Ex. 39, p. 23, 27). Heisler filed a series of General Electric applications showing a long struggle culminating in the same solutions of the problems as taught by the patent in suit. In July, 1927 he stresses the necessity of uniform motion and shows complicated gearing and a brake —no flywheel. He urged combination claims to sound on film apparatus using light, a P.E. cell and arcuate bending over a drum (Respts'. Phys. Ex. 87, p. 13). Later in 1927 he proposed using a flywheel with a complicated friction drive (III, p. 488). His third attempt (III, p. 478, Fig. 1) is close to Fig. 2 of the patent in suit. His fourth effort is again close to Fig. 2 on which he was rejected (Respts'. Phys. Ex. 54, p. 16). In his fifth patent he claims a particular inertia (flywheel) and resilient film drive combination (III, p. 475). Finally, in 1929, he claimed various combinations of an inertia means and associated film drum, a curved support at the projected beam of light and the P.E. cell. These claims were rejected on the patent in suit. Such claims were allowed only after amendments and argument of minor distinctions (Respts'. Phys. Ex. 88, p. 7, 11-15). Western Electric made similar efforts (footnote, *supra*, p. 20).

Thus the important features of the patent in suit were all involved in combination claims for which those associated with R.C.A. or Western Electric asserted invention long after the original inventors, Massolle, Vogt and Engl had reduced the invention to successful practice. To avoid anticipation they resorted to skillful amendments to escape

final rejections on the patent in suit cited against them. Their conduct is persuasive evidence of invention (CL 21a, Appdx., 63; II, p. 1085; *Krementz* v. *Cottle,* 148 U. S. 556, 560; *Cutler-Hammer* v. *G. E. Co.,* C. C. A. 6 F. [2d], 376; *Sugar Apparatus* v. *Yaryan,* C. C., Pa., 43 F. 140, 144).

R. C. A. Also Praised the Invention by Attempting to Procure Rights Under the Patent in Suit Before and After Entering the Commercial Field With Its Infringing Machines.

In correspondence with the Radio Corporation of America (Ex. 13, commencing at III, p. 301; pp. 67-8, *infra*), it appears that Radio Corporation was fully advised of the inventions covered by the patent in suit and being so advised, entered into negotiations for its acquisition. These negotiations failed because the parties could not agree upon price but were renewed when the Radio Corporation concluded to go into the business of supplying equipment for producing and exhibiting sound motion pictures, and organized its subsidiary, R. C. A. Photophone, Inc., for this purpose (F 29, Appdx., p. 26; II, p. 1046; III, p. 311). Even as late as February, 1931, it was still endeavoring to secure a license under the Tri-Ergon patents (III, p. 319, 321).

The Conclusion of Patentable Invention Predicated Upon The Findings of Fact Approved in Both Courts Below Finds Irresistable Support in the Decisions of This Court.

There was an extraordinary advance in the art accomplished by the patentees who first gave to the world satisfactory reproduction of sound recorded by light upon a sensitized film. Others failed where they succeeded. Commercial success attended their accomplishment, driving the Western Electric disc system from the commercial field.

Others who had failed, paid to them the highest tribute of success by imitation of their methods and apparatus. The efforts of those associated with the Radio Corporation and with Western Electric to procure patents upon apparatus embodying the essential features of the patent in suit, disclosed a striking tribute to the merit of this invention. The negotiations of the Radio Corporation before and after entering the commercial market with its infringing machines to acquire rights under the patent in suit, was a further tribute to the invention. In the defense of this suit, the Radio Corporation has failed to show anticipation and in an effort to justify its imitation and infringement, has brought forward only references to the prior art which are more confusing than helpful in the solution of the problems of sound on film reproduction. So far as these references relate to sound on film they disclose persistent effort and consistent failure. So far as they relate to stylus gramophones and motion picture projectors they do not deal with the problems which were solved by the patent in suit. The prior art serves only to emphasize, not to discredit, the striking advance in the art made by the patentees in effecting the combinations of the claims in suit. *Smith* v. *Snow, supra,* page 14. All of these facts were fully established by the evidence and found in the courts below. On such a record there can be no doubt of patentable invention.

In considering the question of invention the court first looks into the art to find what the real merit of the alleged invention is and whether it has advanced the art substantially. If it has done so then the court not only finds invention but is liberal in its construction of the patent to secure to the inventor the reward he deserves. *Eibel Process Co.* v. *Minnesota,* 261 U. S. 45, 63. Both courts below found that the patent in suit discloses apparatus and methods which enabled the successful establishment of a new and important art—sound on film sound pictures, and that it is entitled to a pioneer status since it covers combinations and method steps enabling the first

successful sound reproduction with film records by the use of light (F 23a, Appdx., p. 25; II, p. 1045; CL 2, Appdx., p. 57; II, p. 1078). This finding and conclusion is amply supported by the evidence. Indeed the whole record demonstrates that the patentees were the first to successfully develop sound on film in any practical sense. The primary test of invention has been more than met. This was not mere advance in the art. It was the creation of a new art. Novelty may not be disputed. Utility is established by universal acceptance. That others had tried and failed to accomplish the same result for many years is also established. This was the test of invention applied in *Smith* v. *Snow, supra; Loom Co.* v. *Higgins,* 105 U. S. 580, 591; *The Barbed Wire Patent Case,* 143 U. S. 275, 283; *Krementz* v. *Cottle,* 148 U. S. 556, 559-60, and *Carnegie Steel Co.* v. *Cambria Steel Co.,* 185 U. S. 403, 446. The findings and the proofs establish that the patentees have added "a new and valuable article to the world's utilities" and are therefore entitled to the rank and protection of invention. *Diamond Rubber Co.* v. *Consolidated Rubber Tire Co.,* 220 U. S. 428, 435. If such tests of invention as these applied by this court to patents of slight importance compared to the patent in suit could be ignored and the question of invention thrown into doubt then the commercial success* of the patentees' invention in displacing sound on disc would turn the scale in favor of the patent. Here all the evidence points to invention under the tests of invention laid down by this court and if any doubts remain they should be resolved in favor of the patent because of the prompt and universal acceptance of the patented invention as an im-

*Petitioners cite *DeForest Radio Co.* v. *General Electric Co.,* 283 U. S. 664, 685. In that case the court had no hesitancy in concluding from the findings of the trial court that the knowledge and state of the art was such that Langmuir's high vacuum tube could not under any circumstances be regarded as invention. So concluding, of course commercial success was ruled out on the question of invention.

provement over all of the prior art devices. *Smith* v. *Snow, supra; The Barbed Wire Case, supra; Eibel Process Co.* v. *Minnesota & Ontario Paper Co., supra,* at page 68. *Diamond Rubber Co.* v. *Consolidated, supra,* at page 442; *Krementz* v. *Cottle,* 148 U. S. 556; *Magowan* v. *New York Belting Co.,* 141 U. S. 332, 343.

The decision of the court below is criticized upon the asserted ground that the various elements of the claims do not cooperate in the production of a new result as held in the court below. Accordingly, it is argued the patent discloses a mere aggregation of old devices without the production of any new and useful result. The broad assertion is made that the patentees of the patent in suit contributed nothing to the art and that the only result achieved is that which arises from the well known operation of each one of the elements, and no new function is evolved from the combination. The fact is that each one of the elements brought into combination do cooperate at the translation point both in recording and in reproducing as both courts below held (pp. 32 and 5-9, *supra*), and through this coaction at that point a new result of distortionless sound reproduction has been accomplished which as the courts below have found, first made possible the satisfactory performance of sound motion pictures recorded upon and reproduced from a motion picture film.

A new combination of old elements is patentable if they produce, by their joint action, a new and useful result or an old result in a better way. *Loom Co.* v. *Higgins,* 105 U. S. 580, 591-2; *Seymour* v. *Osborne,* 78 U. S. 516, 548; *Hobbs* v. *Beach,* 180 U. S. 383, 391-2; *Diamond Rubber Co.* v. *Consolidated,* 220 U. S. 428; *Hailes* v. *VanWormer,* 87 U. S. 353; *Palmer* v. *Corning,* 156 U. S. 342, 345; *Grinnell Washing Machine Co.* v. *Johnson Co.,* 247 U. S. 426, 432; *Carnegie* v. *Cambria,* 185 U. S. 403, 437.

Aggregations of old elements without any new and useful result are of course lacking in invention. *Keystone Driller Co.* v. *Northwestern Eng. Co.,* — U. S. —, decided January 7, 1935; *Powers-Kennedy Contracting Corp.* v.

Concrete Mixing Co., 282 U. S. 175; *Concrete Appliance Co.* v. *Gomery*, 269 U. S. 177, 180; *Grinnell Washing Machine Co.* v. *Johnson Co.*, *supra*; *Hailes* v. *Van Wormer*, *supra*; *Palmer* v. *Corning*, *supra*. These decisions, some of them sustaining patentable combinations, others declaring patents upon mere aggregations invalid, clearly show that the patent in suit presents all the merits of patentable invention.

In *American Road Machine Co.* v. *Pennock, et al.*, 164 U. S. 26, upon which petitioners' rely, a patent for a machine for making, repairing and cleaning roads was held void for want of invention. The claim of invention was predicated upon increasing the weight of the old well known hand-wheel for lifting the road scraper employed in this class of machinery. The opinion, as we understand it, goes no further than to hold that road machine mechanisms had been operated by hand-wheels; that such mechanism was a "common device" and had been used in various machines, and a heavy wheel in "*this class of machinery*" to secure "the well known result", was not patentable. After an exhaustive review of the prior art this Court concluded (164 U. S., p. 41):

> "But the decision of the Circuit Court rested on the want of invention, and in that conclusion we concur.
>
> "'The whole essence of the Taft invention', says appellant's counsel, is the application of momentum to carry the wheel along 'sufficiently to enable the operator to take a new grasp (as explained by Mr. Breevort), without clamping the wheel to prevent its running backward'.
>
> "Did increasing the weight of the hand-wheels *in this class of road machines*, in order to correct the tendency of smaller wheels to reverse, involve patentable novelty?
>
> "We do not think so. The use of hand-wheels as a substitute for straight levers *in this class of machinery* was old, and whether the wheels were light or

heavy (and heavy wheels were old), they alike performed the service of rotary levers." (Italics ours.)

Petitioners seem to contend, no use of a flywheel in any combination for any purpose can be patentable, no matter what the character of the machine embodying it, or the arrangement, purpose or result may be. Of course this is not the law, and the *Road Machine* case did not so hold.

In *Robertson* v. *Blake,* 94 U. S. 728, the patentable machine was certainly not the first commercially successful stone crusher. It could not be compared in its relation to the art with the apparatus disclosed by the patent in suit. And yet in that case this Court found the use of a flywheel in combination with a revolving shaft and a movable jaw to be patentable invention. Even a novel application of the force of gravity may involve invention. *Eibel Process Co.* v. *Minnesota & Ontario Paper Co.,* 261 U. S. 45, 64; *Rockwood* v. *General Fire Extinguisher Co.,* 8 F. (2) 682 (C. C. A. 2); (Certiorari denied, 269 U. S. 571).

The presumption of validity has been vastly strengthened by the proofs and findings in this case and there is no merit in the contention that the patent is invalid for lack of invention.

POINT II.

The court below did not err in its conception of the invention of the patent in suit.

Petitioners contend that the court below fell into error by regarding the invention as a combination of all the elements disclosed in the specification, rather than as a combination of such of the separate elements as are brought into combination in the separate claims in suit. There is no basis in law for this contention. The principle is well established that a patentee having invented a new and useful combination consisting of several elements, may

secure the full benefit of the exclusive right to each of several combinations and sub-combinations by separate claims which are supported by the disclosure in the specification. *Ira Gill* v. *Eliza Wells,* 89 U. S. 1; *Brown* v. *Gill,* 90 U. S. 181, 226; *Telephone Cases,* 126 U. S., at page 572; *William Deering* v. *Harvester Works,* 155 U. S. 284; *Philadelphia, Wilmington, Baltimore R. R.* v. *John DuBois,* 79 U. S. 47; *Robinson on Patents,* Vol. II, page 143; Par. 528; 1890 Ed.; *Walker on Patents,* 6th Ed., 1929, Vol. I, pages 193-194, Par. 162.

The reason for this rule was very clearly and concisely stated by Taft, C. J., in *Roberts* v. *H. P. Nail Co.,* 53 F. 916 (C. C., N. D., Ohio, E. D.), where, after quoting the rule from Robinson to the effect that claims for each subordinate piece of mechanism may be joined with those for the principal machine though not capable of use in any other known connection, the learned Circuit Judge said (p. 921):

> "A little reflection shows that this cannot be otherwise, in view of the strict rule applying against the patentee of a combination, on the question of infringement. The omission by the respondent from the combination of complainant of a single element, whether that be old or new in itself, defeats the claim of infringement. That patentees may properly protect what is really new in the combination, they must therefore be given the opportunity to select out a part or parts which are new, less than the whole working machine, and by their claims warn the public against the use of them in any other combination to accomplish the same general result as that for which they were used by the patentee in his complete machine" (p. 921).

In applying these principles, of course, it was necessary for the court below to consider the nature of the invention disclosed by the patent as a combination of various elements of importance in photographically recording and in reproducing

sound on film, and in doing so it did not misconceive, but on the contrary properly appraised the invention of the patentees as disclosed in their specification. The claims allowed by the Patent Office upon this disclosure were not confined to a single combination of all the elements disclosed, but various novel sub-combinations of great utility in the reproduction of sound on film by means of light were properly claimed in accordance with the established principle. The court below did not ignore the nature of these sub-combination claims but on the contrary approved the findings of the trial court that they were valid and infringed; and so they were, for the record does not disclose any anticipation of these combinations or sub-combinations in any machine designed for the reproduction of sound on film by the use of acoustically modulated light. The court below so held for it said in its opinion (II, p. 1162): "The trial judge said that the combination and methods of the claims of the patent in issue are not found in any prior art citations and are new and useful. A close study of the citations confirms this finding." The finding thus confirmed referred to the combinations and methods of the claims (F 74, Appdx., p. 56; II, p. 1078). The statement in petitioners' brief at page 49 that the claims in suit were not compared with the prior art is not accurate. It was therefore enough that these sub-combinations being new, were useful in combination with the other elements disclosed by the patentees.

POINT III.

The disclaimer is valid.

The trial court in its opinion held (II, p. 1034):

> "The disclaimer limits the patent and does not enlarge it. The subject matter of the disclaimer is consistent and in accordance with the teachings of the patent. No part of the disclaimer broadens or pur-

ports to broaden the scope of the claim of the patent. The presumption of validity of the patent in suit is uneffected by the disclaimer and the claims in suit here, as modified by the disclaimer, are valid. *Carnegie Steel* case, 185 U. S., at 435" (II, p. 1034).

The court below considered this defense, regarded it as unsubstantial, and affirmed the decision of the trial court (II, p. 1172).

The decisions in both courts below were predicated upon Finding No. 72 and Conclusions Nos. 24 and 25 (Appdx., p. 56, 63, 64; II, p. 1077, 1086, 1087):

"72. That each of the features by which the claims in suit are qualified by disclaimer, was shown and described in the application for the patent as filed and in the patent as granted" [II, p. 1077].

"24. Paragraph (a) of the disclaimer limits the patent in suit to apparatus wherein, and methods whereby sound is translated by light to or from a film strip moving uniformly past said light. The subject matter of said limitation is entirely consistent and in accordance with the teachings of the patent. The patent discloses translating the sound in that manner only and it was already claimed in several of the claims as issued; for example, see claims 9, 13 and 18 in suit.

"Under paragraphs (b), (c) and (e), respectively, claims 9, 13, 18 and 19 are specifically limited to the feature of flywheel control. The subject matter of said limitation is entirely consistent and in accordance with the teachings of the patent which discloses such means of speed control, and this feature is claimed in several of the claims as issued; see for example claims 5 and 7 here at issue.

"Under paragraph (d) of the disclaimer, claim 17 is limited to a sprocket forming a part of the carrier progressing means, and to its location with respect to a portion of the periphery of the cylinder already included in the claim. The subject matter of said limitation is entirely consistent and in accordance with the teachings of the patent which fully describes this arrangement; for example, in connection with Fig. 2 of the patent.

"No part of the disclaimer broadens or purports to broaden the scope of any claim of the patent" [II, p. 1086].

"25. Even if it be assumed (for discussion only) that the disclaimer to claim 17 adds another element or sub-element to the combination of the claim, such a disclaimer is nevertheless permissible and valid (*Hurlbut* v. *Schillinger*, 130 U. S. 456, * * * *Strause* v. *Crane*, 235 F. 126") [II, p. 1087].

These conclusions reached in both courts below are fully sustained by reading the patent (III, p. 5), the original patent application (III, p. 15) and the disclaimer (III, p. 227), from which it appears that:

(1) No claim is broadened by the disclaimer. (2) Each of the features by which the claims in suit are qualified by disclaimer was shown and described in the application for the patent as filed and in the patent as granted. (3) Each of the limitations by disclaimer was actually included in one or more of the claims of the patent as issued. (4) Each limitation is entirely consistent and in accordance with the teachings of the patent. (5) The disclaimer qualifies the already claimed apparatus or method by limiting it to one wherein the sound is translated by light to or from the film, the only method or means disclosed in the patent as issued. Several claims already included this feature. (6) The disclaimer qualifies claims 9, 13, 18 and 19, by prescribing flywheel control to give uniform motion

already required by the claims. This feature is disclosed in the specification and covered in several of the claims as issued. (7) The disclaimer qualifies claim 17 by limiting it to a sprocket forming a part of the "carrier-progressing means" (already in the claim) located with respect to a portion of the periphery of the "cylinder" already in the claim. This construction is in accordance with the teachings of the patent, which describes the arrangement, for example, in connection with Figure 2.

Upon this state of facts the disclaimer was valid under the decisions of this Court in *Dunbar* v. *Meyers*, 94 U. S. 187, 192-194; *Hurlbut* v. *Schillinger*, 130 U. S. 456; *Carnegie Steel Co.* v. *Cambria Iron Co.*, 185 U. S. 403, 435, 436; and *Minerals Separation* v. *Butte &c., Mining Co.*, 250 U. S. 336, 354.

In *Dunbar* v. *Meyers, supra*, the claim was for a saw and "one or both" deflecting plates. By disclaimer the words "one or" were struck out so that the claim was for a saw and both deflecting plates. This Court said the authority to make such a disclaimer was beyond question, and further held (p. 193):

> "Where the effect of the disclaimer is to diminish the claims of the patent without prejudicing the rights of the respondent, the suit may proceed, notwithstanding the disclaimer; it being held that the disclaimer, under such circumstances, does not affect the pending suit, except to limit and qualify the claims of the patent, and in respect to the question of unreasonable neglect or delay in filing the same."*

It is difficult to see how petitioner's rights may be prejudiced if upon being sued for infringement the claims in-

*The matter of unreasonable delay, of course, only applies after the claims have been held invalid by the courts (*Minerals Separation* v. *Butte, &c., Mining Co.*, 250 U. S. 336, 354; *Sessions* v. *Romadka*, 145 U. S. 29, 41-2.

fringed are narrowed and diminished. The function of the disclaimer is to narrow the claim by the added element and its function ends with the retrocession introduced. *United Chromium* v. *International Silver Co.*, 60 F. (2d) 913, 915 (C. C. A. 2d), cert. denied, 288 U. S. 600; *Carson* v. *American Smelting & Refining Co.*, 4 F. (2d) 463, 469 (C. C. A. 9th), cert. denied, 269 U. S. 555; *Marconi* v. *DeForest*, 243 Fed. 560, 565 (C. C. A. 2d). A disclaimer can be made only when it is intended to limit a claim. *Cartridge Co.* v. *Cartridge Co.*, 112 U. S. 624, 642. It seems to be contended by the petitioners that having concluded that they could safely infringe because the claims were too broad, they are now deprived of their right to do so because the owner of the patent has exercised its statutory right to disclaim by diminishing its claims. To this contention the statute which gives the right is sufficient answer.

In *Hurlbut* v. *Schillinger, supra,* the claim was for "a concrete pavement laid in detached blocks or sections, substantially in the manner shown and described". The specification stated that the blocks might be "formed without interposing anything between their joints". A disclaimer was filed the legal effect of which was declared by the Court (p. 465):

> "The disclaimer took out of the first claim of the reissue only so much thereof as claimed a concrete pavement made of the plastic material laid in detached blocks, *without interposing anything in the joints in the process of formation,* leaving that claim to be one for such a pavement laid in detached blocks, where free joints are made between the blocks, *by interposing, permanently or temporarily between them, in the process of their formation, tar-paper or its equivalent.*" (Italics ours.)

Of course the effect of this was to add another element to the claim although the scope of the claim was narrowed and diminished. This was also the effect of the disclaimer

in *Carnegie Steel Co.* v. *Cambria Iron Co., supra,* as Judge Learned Hand pointed out in *Strause* v. *Crane,* 235 Fed. 126 (C. C. A. 2). The disclaimer held sufficient and therefore valid in *Minerals Separation* v. *Butte, &c., Mining Co.,* 250 U. S. 336, limited the claims by limiting the quantity of oil to be used in a process of mineral separation. Claims which specified the use of a *small quantity* of oil, had been held invalid in another suit. A disclaimer to these claims of "any process of concentrating powdered ores, excepting where the results obtained are the results obtained by the use of oil in a quantity amounting to a *fraction of 1 per cent.* on the ore" was held valid under the statute.

The law permitting and requiring disclaimers is not penal, but remedial. It is intended for the protection of the owner of the patent as well as the public, and should be fairly construed so that disclaimers, which after all are in the interest of the public, may be encouraged and the owners of patents may not be penalized by forfeitures if inadvertently they claim too much. This was the rule under the Act of 1837, 5 Stat. L. 193; *O'Reilly* v. *Morse,* 15 How. 62, 121. See also *Silsby* v. *Foote,* 14 How. 218, 220-221. Of the present statute this Court said, in *Sessions* v. *Romadka,* 145 U. S. 29, 40:

> "The power to disclaim is a beneficial one, and ought not to be denied except where it is resorted to for a fraudulent and deceptive purpose".

Such a purpose is well illustrated by *Hailes* v. *Albany Stove Co.,* 123 U. S. 582, where, as the court stated, attempt was made by merely filing a paper to make a new patent or one for a different invention from that shown or described in the specification and drawings of the patent. This Court also said in that case (p. 587):

> "The first claim, as modified by the disclaimer, has nothing in the specification to stand upon, nothing to explain it, nothing to furnish a reason for it."

Nothing of the kind appears in this case. On the contrary, all the claims as modified by the disclaimer read upon the specification in the application for letters patent originally filed as well as upon the specification of the patent.

Fruehauf Trailer Co. v. *Highway Trailer Co.*, 67 F. (2d) 558 (C. C. A. 6), involved facts similar to those in the *Hailes* case. The Court held that the disclaimer did not limit the combination claimed but expanded it to cover structures upon which it could not before have been read and in effect claimed a new and a different combination by the addition of a structural feature which was not disclosed. In the opinion of the trial court (54 F. [2d] 691) the facts are set forth at length. With respect to one of the disclaimers it appears that the apparatus claimed in the patent was concededly inoperative, and that the effect of the disclaimer was to add to the invention operative features which were not disclosed at all in the patent, which were not only not thought of by the patentee but were contrary to the instruction of his patent. With respect to the other disclaimer the same situation appeared, because the original claim was directed entirely to a trailer—not a tractor—and contained no reference to a tractor. The disclaimer introduced the tractor—a different machine—making a new claim out of the original—a claim for the combination of a trailer and tractor.

Obviously this case was ruled by the decision of this Court in the *Hailes* case, *supra*, and statements of a general character in the opinion unnecessary to a decision upon the facts of the case are not authoritative. *Cohen* v. *Virginia*, 6 Wheat. 264, 399; *Weaver* v. *Palmer Bros.*, 270 U. S. 402, 414; *Tyson & Bro.* v. *Banton*, 273 U. S. 418; *Sterling* v. *Constantin*, 287 U. S. 378, 400; *Home Bldg. & L. Asso'n* v. *Blaisdell*, 290 U. S. 398, 434.

In this case the equities are all with the respondents. The Radio Corporation of America and its subsidiary R. C. A. Photophone, Inc., admittedly the real parties in

interest, are defending both suits because they supplied the infringing machines to the petitioners (Pets.' Brief, p. 2), and they are urging upon this Court their own equities. The following appears in the petitioners' brief (at p. 62):

> "Petitioners' type P.S.-1 machine was placed on the market as early as October, 1928, which was considerably before the patent issued. And the type P.S.-16 was introduced in December, 1929. *Both machines were kept on the market in the belief that the patent as issued was clearly invalid. And the R. C. A. Photophone business, involving large investments made in good faith, was based on these machines. Their continued use should not be enjoined by a court of equity at the behest of respondents, who in view of their disclaimer, certainly have not done equity*" (Pets.' Brief, p. 62). (Italics are as they appear in the original.)

Counsel for the Radio Corporation in making this statement neglected to call to the Court's attention the following facts appearing without contradiction in the record.

In September, 1925, the Radio Corporation seriously considered the Tri-Ergon inventions with a view to purchase, and in this connection the inventions were fully disclosed to it although the United States patents had not issued (R. C. A. Correspondence, Ex. 13, commencing at III, p. 301). Among the patents and patent applications furnished to the Radio Corporation were copies of German patents 389,317; 389,318 and 389,319 and translations (III, p. 302). These applications together disclose the subject matter of the inventions in suit (Exs. 4, 5 and 6, III, p. 242, 254 and 263), with drawings of the structures corresponding to Figures 1, 2, 3 and 4 of the patent in suit (III, p. 247, 257). These inventions were given long and careful consideration by the Radio Corporation and it was not until April, 1926, that the negotiations ended because

the parties could not agree on price. The door was left open by Mr. Adams, of the Radio Corporation, with this statement: "It might be that we would be interested in the patents when they are allowed" (III, p. 308). In September, 1927, the Radio Corporation concluded to go into the business of supplying equipment for producing and exhibiting sound motion pictures, and R. C. A. Photophone, Inc., was organized for this purpose (F 29, Appdx., p. 26; II, p. 1046; III, p. 311). In May, 1928, a year before the patent was allowed, and five months before putting the PS-1 machines on the market, the Radio Corporation again expressed its interest in acquiring the Tri-Ergon inventions (III, p. 310-11). Nothing came of the matter because the option held by Fox had already been exercised (I, p. 224). Even as late as February, 1931, Radio Corporation was still endeavoring to secure a license under the Tri-Ergon patents "upon a reasonable basis", and the conclusion of all of these negotiations at that time was a statement from Radio Corporation,

> "our people would be definitely interested in securing rights both for theatre and home fields if such rights could be secured upon a reasonable basis" (III, p. 319, 321).

These negotiations belie the italicized statement of counsel for the Radio Corporation quoted above from page 62 of petitioners' brief. There is no finding or evidence to support the statement that the Radio Corporation or anyone else believed that the patent was clearly invalid. Even their counsel after suit was threatened, did not assert invalidity but seemed only to assert non-infringement (III, p. 313, line 1; p. 315). The Radio Corporation did not believe that the patent was clearly invalid, as its own correspondence shows, and their investments in PS-1 and PS-16 machines which infringed the claims as originally granted and as limited by disclaimer, were not made in

good faith but with knowledge of the application and later of the issued patent, the subject matter of which they embodied in their own machines.

Counsel assert that the disclaimer was drawn on the infringing structures.* The PS-1 machine was put on the market on October 28, 1928 (F 29, Appdx., p. 26; II, p. 1046), after claims 5, 7 and 9 had been presented in the Patent Office as issued (III, p. 52-3, 79). Infringement by this machine of claims 5, 7, 9, 13, 18 and 19 was found in both courts below (F 35, Appdx., p. 28; II, p. 1048). The PS-16 machine was put on the market in December, 1929 (F 29, supra) after the patent issued, and was found to infringe claims 9, 13, 17, 18 and 19 (F 36, Appdx., p. 29; II, p. 1049).

Inasmuch as the claims as issued were broader than the claims as limited by disclaimer, the infringing machines were covered by the claims as issued. What the respondents really object to is the limitation of claims which they assert were too broadly drawn. The disclaimer statute (Pets.' brief, p. 63) expressly recognizes the right of the patent owner "to make disclaimer of such parts of the thing patented as he shall not choose to claim or to hold by virtue of the patent", and if "through inadvertence, accident or mistake, and without any fraudulent or deceptive intention, a patentee has claimed more than that of which he was the original or first inventor or discoverer,

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*It might be inferred from counsel's statement on page 11 of petitioners' brief, that the disclaimer was drawn and filed *immediately* after acquiring information as to the infringing machine. No such inference is warranted by the record. The respondents had full information of the infringing machines before these suits were commenced and as early as January, 1931 (III, p. 312-317). These suits were commenced in October, 1932 (I, p. 1-5). The disclaimer was filed in June, 1933, before the trial commenced (III, p. 228).

his patent shall be valid for all that part which is truly and justly his own provided the same is a material or substantial part of the thing patented". In this case there has been no abuse of the right to disclaim. The decision of this Court in *Dunbar* v. *Meyers,* 94 U. S. 187, cited *supra,* is precisely in point. There the Court said (at p. 193):

> "Where the effect of the disclaimer is to diminish the claims of the patent without prejudicing the rights of the respondent, the suit may proceed, notwithstanding the disclaimer; it being held that the disclaimer, under such circumstances, does not affect the pending suit, except to limit and qualify the claims of the patent, and in respect to the question of unreasonable neglect or delay in filing the same. Unreasonable delay not having been suggested, the only effect of the disclaimer in such a case is to limit the nature of the invention secured by the patent, and to diminish the claims of the patent as set forth in the specification."

Matters in Petitioners' Brief Not Assigned As Errors.

The petitioners having assigned as errors to be relied on in this court only the failure to hold the claims in suit invalid because of anticipation and want of invention, and the failure to hold the disclaimer invalid (Pets.' brief, p. 14), we have not discussed in this brief questions of infringement, joint invention and the criticism of claims 9, 18 and 19 as improper method claims, incidentally referred to in petitioners' brief, believing that under the rules and practice of this court such questions are not presented for review. These questions are fully covered by findings of the trial court supported by the citation of authorities (F 35, 36, CL 8, 22-3, 36, Appdx., p. 28-9, 58, 63, 67; II, p. 1048-9, 1080, 1085, 1090). It should also be noted that the petitioners have asserted in substance that the dis-

closure was insufficient and the claims were unlawfully expanded in the Patent Office. This point is not presented by the specification of errors to be relied upon in this court. It is shown to be without foundation in the analysis of the patent and the claims in suit (*supra*, p. 21 to 32).

CONCLUSION.

The patent claims in suit are valid, as held in both courts below, and the judgments below should be affirmed.

Respectfully submitted,

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